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COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries prepared in the BUREAU OF COMMERCIAL FISHERIES.

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COVER: Atlantic skipjack tuna in the hold of an East Coast purse-seiner. This is part of a 44-ton set made 40 miles south of Block Island, R. I., August 6, 1963. The fish range in size from 7-10 pounds. Quantities of skipjack were first discovered off the Atlantic Coast states in 1962; over 3,000 tons were taken during the 1963 tuna purse-seing season. (See p. 1 of this issue.)

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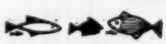
PORTABLE CLOUD-MAKING MACHINE HELPS CHECK GROWTH OF AQUATIC WEEDS

A portable machine that creates a constant underwater cloud has been developed to help halt the growth of troublesome aquatic weeds along shorelines. The apparatus, which contains a pump and a series of hoses with holes, uses water or air-pressure jets to agitate materials on the sea bed, thus creating a muddy cloud. The cloud shades the sea bottom from the sun, which is necessary for the germination and growth of aquatic weeds.

The cloud has to be maintained only during the early spring or summer in the germinating period of the weeds. Then the apparatus can be removed and the treated area will remain weed-free for the rest of the year.

The cloud-making machine, which was invented by a resident of Annapolis, Md. (Patent No. 3,151,463), can also spray liquid weed killers. (Science News Letter, October 24, 1964.)



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COMMERCIAL FISHERIES REVIEW

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REVIEW OF THE DEVELOPMENT OF THE ATLANTIC COAST TUNA FISHERY

By Peter C. Wilson*

ABSTRACT

Bluefin tuna are seasonally abundant along the New England coast where they have been of minor commercial importance for many years. In 1951 the U.S. Fish and Wildlife Service began investigating that resource to determine whether a New England tuna fishery was feasible. The results of those investigations showed that several different species of tuna were present in the Northwest Atlantic beyond the U.S. Continental Shelf. The Fish and Wildlife Service sponsored purse-seine trials in 1951 and 1954, and the 1958-61 operations of a commercial vessel (with which the Service's Bureau of Commercial Fisheries cooperated) demonstrated that commercial quantities of bluefin tuna could be harvested in New England waters. During 1962 and 1963 the new tuna fishery had a purse-seine fleet of 16 United States and 2 Canadian vessels. The season lasted 5 months and the fishing area included all of the Continental Shelf from Virginia to Massachusetts. A skipjack resource was also discovered. In 6 years the Atlantic Coast tuna purse-seine catch rose to 9,000 short tons, including 3,000 tons of skipjack.

BACKGROUND

Until recent years the tuna stocks off the Atlantic Coast of the United States were largely ignored because no ready market for them existed. Other tuna species were noted occasionally, but the bluefin tuna (Thunnus thynnus) was long considered the major tuna resource in the Northwest Atlantic. This belief can be attributed to seasonal catches and occurrence of "horse mackerel" or bluefin tuna from Cape Hatteras to Nova Scotia, and to the substantial catches made by commercial and sport fishermen in the northern part of the tuna's range (table 2).

Table 1 - Summary Data on the U. S. Atlantic Coast Purse-Seine Tuna Fishery 1/

	2/ 1963	2/ 1962	1961	1960	1959	1958
	(Tons)					
Catch:						
Bluefin	5,933	3,379	1,032	338	757	185
Skipjack	3,195	479	-	-	-	-
Total	9,128	3,858	1,032	338	757	185
Number of vessels	18	7	2	1	1	1
Total capacity (tons)	5,525	1,015	125	45	45	45
Average capacity (tons)	307	145	63	45	45	45
Catch per vessel (tons)	507	551	516	338	757	185
Number of trips	128	100	86	20	30	29
Catch per trip (tons)	71.3	38.6	12.0	16.9	25.2	6.4
Days fished (all vessels)	3/	387	96	22	31	32
Catch per fishing day (tons)	3/	10.0	10.8	15.4	24.4	5.8
Length of season (days)	126	120	90	38	55	72
Number days fish caught	3/	59	44	12	21	18

1/Data based on logbooks and interviews; catches do not reflect landed tonnage.
2/1962 and 1963 figures are preliminary; data from 2 Canadian vessels are included in 1963
3/Data not completed.

Annual tuna movements into the coastal waters of the Northwest Atlantic had received very little attention prior to 1950. Bluefin tuna generally arrive on the Continental Shelf north of Cape Hatteras during June and remain as late as October. It is not known where they come from or where they go between their seasonal visits. Records show that arrivals, departures, abundance, and availability of differ-

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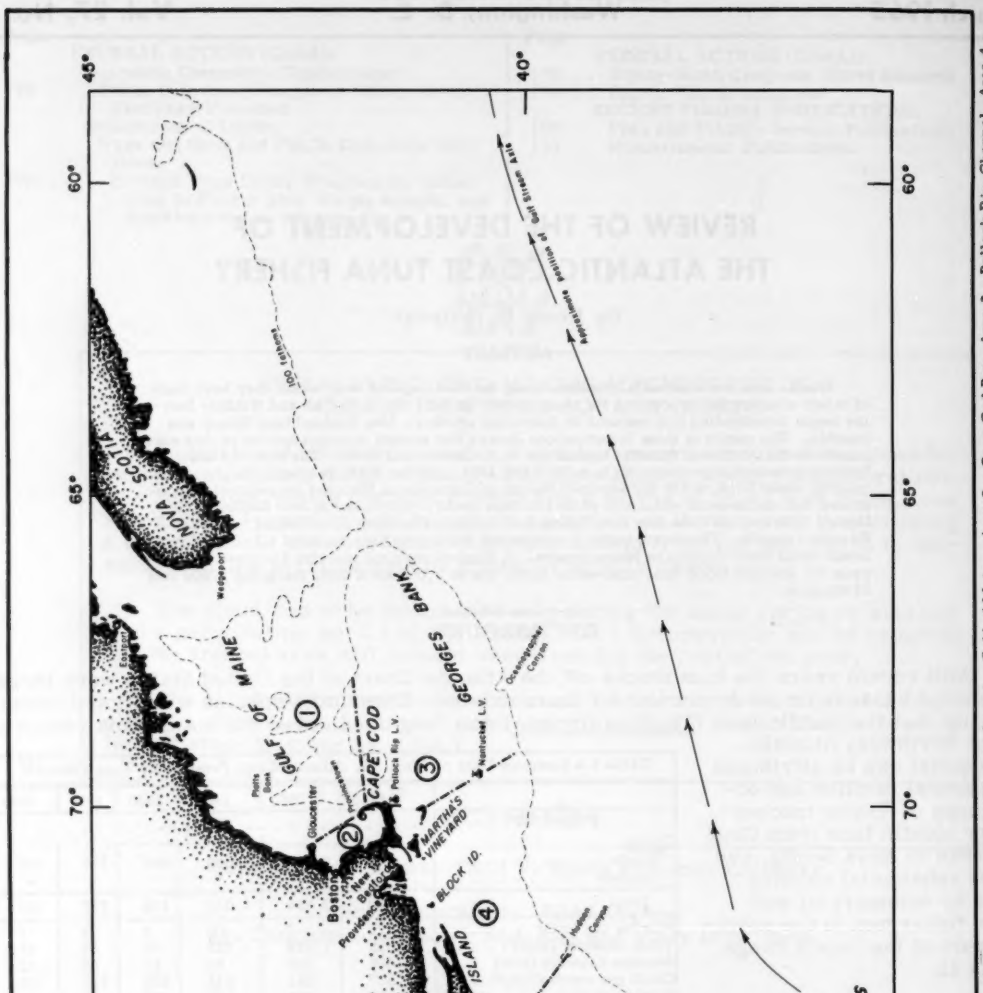

Fig. 1 - Fishing areas of the Atlantic Coast tuna purse-seine fishery: Area 1 - Gulf of Maine, Area 2 - Cape Cod Bay, Area 3 - Pollock Rip-Channel, Area 4 - Martha's Vineyard-Long Island, Area 5 - New Jersey-Virginia.

ent size groups vary considerably from year to year. The larger tuna (over 100 pounds) have dominated the catches north of Cape Cod, while the smaller sizes were caught frequently from Cape Cod Bay south (Bigelow and Schroeder 1953).

COMMERCIAL CATCHES: The Atlantic Coast tuna resource has been a matter of commercial speculation as long as tuna have been observed and taken in those waters. Until 1959, with some exceptions, Massachusetts pound nets caught most of the bluefin tuna landed in New England. Most of those tuna were marketed as fresh fish in New England and New York.

Several vessels operating out of Gloucester, Mass., during the period 1937 to 1941, attempted purse seining for bluefin tuna (Murray 1952; table 2). Except for the Western Explorer, a California purse-seine vessel using a West Coast tuna seine, the small fleet was equipped with modified mackerel seines. The low price paid for the fish and the extensive damage to the light mackerel nets eventually resulted in discontinuation of the fishery. In 1937 the first bait-fishing for bluefin tuna in the Northwest Atlantic was tried. The Gloucester schooner-dragger Elvira Gaspar was rigged with two racks, a bait tank, and poles, and fished with live herring bait during July and August off southern Maine and on the southeast part of Georges Bank. Failure to catch any tuna was attributed to "wild" fish and difficulty in keeping the bait alive.

In years of abundance, significant bluefin tuna catches in New England have been made with other types of gear. During 1949, harpoons accounted for 160,000 pounds and hand lines for 1,415,300 pounds. Occasional large catches have been made from small boats using long-line gear (Wilson 1960).

Table 2 - Atlantic Coast Bluefin Tuna Catches Landed in the United States, 1930-63 1/

	Purse Seine	Traps	Other	Total
	(1,000 Pounds)			
1963 2/	12,456	3/	3/	3/
1962 4/	6,620	3/	3/	3/
1961	1,992	174	201	2,367
1960	611	450	343	1,404
1959	1,722	667	429	2,818
1958	304	1,916	256	2,476
1957	-	891	110	1,001
1956	1	399	59	458
1955	1	830	65	896
1954	122	1,170	136	1,428
1953	-	1,688	257	1,945
1952	-	298	267	565
1951	221	1,081	458	1,761
1950	2	764	501	1,267
1949	1	1,100	1,637	2,738
1948	1	1,881	1,113	2,995
1947	1	435	651	1,087
1946	-	668	517	1,185
1945	-	446	937	1,383
1944	10	321	498	829
1943	1	170	309	480
1942	1	231	595	827
1941	3/	3/	3/	3/
1940	302	321	532	1,155
1939	311	202	437	950
1938	978	598	247	1,823
1937	137	672	213	1,022
1936	3/	3/	3/	3/
1935	17	234	317	567
1934	3/	3/	3/	3/
1933	-	318	130	448
1932	43	156	117	316
1931	-	157	165	322
1930	-	131	165	296

1/Traps include pound nets, floating traps, and weirs; other includes hand lines, otter trawls, harpoons, troll gear, etc.
2/Preliminary, includes 2,118,000 pounds skipjack and 3,272,000 pounds mixed bluefin and skipjack in 1963; additional 5,800,000 pounds bluefin and skipjack were landed in Canada and Puerto Rico.
3/Data not available.
4/Preliminary, includes 942,000 pounds skipjack in 1962; additional 690,000 pounds bluefin tuna were landed at Puerto Rico.
Source: 1930-61--Fishery Statistics of the U.S., Annual Reports, and 1962-63--Fishery Market News Service, Boston, Mass., logbooks, and interviews.

PROCESSING: Lack of uniform-size fish in the catches and an unpredictable supply complicated early processing attempts. Several small-scale canning operations were established for short periods, starting as early as the late 1920's in Gloucester, Mass. Raw tuna supplies consisted almost entirely of local bluefin from purse seines, traps, harpoons, and hand lines. One notable exception was the 1952 landing of 172,300 pounds of skipjack and 412,000 pounds of yellowfin tuna in Gloucester by the West Coast bait-boat Sun Jason (Slavin and Smith 1963). None of that catch was taken from the Northwest Atlantic, and the vessel did not fish in those waters after leaving Gloucester.

EXPLORATORY FISHING

GULF OF MAINE EXPLORATIONS: A number of interrelated factors hindered development of a tuna fishery. These were: (1) the shortness of the season, (2) uncertain annual availability of raw tuna supplies, (3) excessive size range, (4) lack of proper vessels and gear, and (5) lack of adequate canning facilities. In 1950, Congress took an early step to resolve

Fig. 1 - Fishing areas of the Atlantic Coast tuna purse-seine fishery: Area 1 - Gulf of Maine, Area 2 - Cape Cod Bay, Area 3 - Pollock Rip-Channel, Area 4 - Martha's Vineyard-Long Island, Area 5 - New Jersey-Virginia.

some of these problems through initiation of a Fish and Wildlife Service exploratory study of the New England bluefin tuna potential. One of the principal objectives was the testing of various fishing gears to determine the most efficient methods for capturing tuna in commercial quantities. Purse-seine operations were started with two West Coast-type vessels, the Western Explorer in 1951 and the Western Pride in 1954 (Murray 1952, 1955). Long-line, gill-net, and trammel-net trials were conducted from the chartered schooner Marjorie Parker in 1952 and 1953 (Murray 1953, 1954).

Results of the explorations were encouraging but inconclusive. The purse-seine method was found to be the most promising, and stocks of bluefin tuna sufficient to support a New England tuna industry were observed in coastal waters during summer.

Four years of explorations generated interest in a New England tuna fishery but very little activity on the part of the industry. A sardine cannery, located at Eastport, Maine, installed tuna-canning equipment in 1951 and operated intermittently. In 1954, a Bureau-owned tuna purse-seine and accessory gear were offered for loan to any commercial fisherman who would convert his vessel for tuna seining in New England waters and thus undertake a cooperative tuna-seining operation with the Bureau. The offer was not accepted until 1958. No additional vessels entered the fishery at that time.

CONTINENTAL SHELF EXPLORATIONS: The Bureau began two new projects to help develop a tuna fishery. The Bluefin Tuna Exploration project, initiated in 1955, made further investigations on the Continental Shelf off New England. The Oceanic Tuna Exploration project, started in 1956, concentrated on tuna surveys beyond the Continental Shelf. After those two projects ended in 1960, the Pelagic-Oceanic project, started in 1961, continued oceanic tuna survey work.

Under the Bluefin Tuna Exploration project live-bait fishing for bluefin tuna was tried during two cruises in waters south of Cape Cod in the summer of 1955. During one of the cruises (aboard the chartered vessel Stormy Weather II), 2,500 pounds of tuna were caught 20 miles south of Martha's Vineyard on August 16--the first tuna catch in the Northwest Atlantic by that method. Poles were rigged with feathered barbless hooks, and live butterfish were used as bait.

The most important single development in the establishment of the New England tuna fishery came in 1958 when the owner of a Provincetown, Mass., trawler, the Silver Mink, agreed to fish for bluefin tuna in New England waters using the Bureau's purse seine and other gear originally offered in 1954 (Squire 1959). After initial success, a 28-inch power block was added under the agreement in 1959--the first application of such equipment to tuna purse seining in New England. Beginning in 1959, the linen and cotton seine net was replaced gradually with nylon webbing.

OCEANIC EXPLORATIONS: Explorations on the Continental Shelf were designed to provide a base for the immediate development of the tuna fishery. To aid in the long-range support of the fishery, oceanic tuna explorations were planned to provide background knowledge of the tuna resource over a much wider range of the Northwest Atlantic.

No knowledge of extensive tuna stocks beyond the Continental Shelf was available, but Bigelow and Schroeder (1953) had suggested that New England bluefin tuna may winter in deep water along the Continental Slope off the Middle Atlantic coast. Eight cruises of the Bureau's vessel Delaware (Squire 1962) and one cruise of the Woods Hole Oceanographic Institution's vessel Crawford (Mather and Bartlett 1962) resulted in significant catches of bluefin and yellowfin tuna (Thunnus albacares) on long-line gear fished in those waters at various times of year.

While long-line tuna catches have no direct correlation with commercial purse-seining potential, the catch rates do indicate relative abundance of tuna in subsurface layers, and provide distributional information unobtainable with surface sampling gear. Long-line catches in waters south of New England from the Continental Slope to the northern edge of the Gulf Stream

indicated unusually high concentrations of bluefin tuna just before the fish appear in the inshore fishery and shortly after they depart. The recovery, from the inshore purse-seine fishery, of five bluefin tuna tagged and released from the offshore catches (F. J. Mather III, personal communication, and Mather 1960) suggests that availability of bluefin tuna in the seasonal fishery may be related to subsurface bluefin distribution and abundance observed from long-line catches in the adjacent oceanic waters.

CAPE COD FISHERY, 1958-61

"SILVER MINK:" The first tuna purse-seining season was an experimental one for the Silver Mink, a southern shrimp vessel that had been converted to trawling for industrial fish (fig. 2).1/ Other than 2 days spent scouting east of Cape Cod, and 3 days off Block Island, the entire 72-day season was fished in Cape Cod Bay and adjacent waters (table 3). Twenty-six out of 42 sets were successful. Average size of the fish in the catches ranged from 60 to 80 pounds; schools ranged from 1 to 60 tons and averaged about 16 tons. Shoal-water fishing, with resultant mudding of the nets, and large schools caused extensive net damage. Fish were landed the day they were caught and trucked from Provincetown to the cannery at Eastport, Maine.

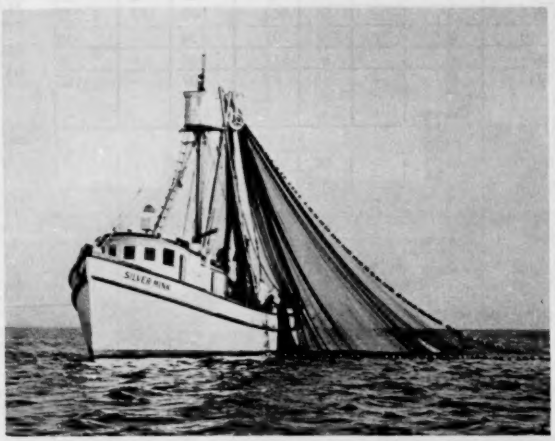

Fig. 2 - The Provincetown, Mass., purse seiner Silver Mink working a 10-ton set of bluefin tuna in Cape Cod Bay, September 1961.

In 1959 the Silver Mink quadrupled its previous year's catch in a shorter fishing season of 55 days. An all-nylon seine and a power block, in addition to experience gained the first year, contributed to this success. Daily average size of the fish ranged from 118 to 142 pounds during the season, and the size of the fish for the entire season averaged 131 pounds. The smallest day's catch was about 10 tons; the largest was 130 tons, requiring aid from several vessels to land the catch. All operations were within a day's run from Provincetown and catches again were trucked to the Maine cannery. A decrease in the 1960 catch (table 3) resulted primarily from decreased fishing effort, caused by unsettled market conditions.

NEW TUNA PACKING CORPORATION: Two events in 1961 gave the struggling tuna fishery a renewed outlook for the future. A newly formed tuna packing corporation leased the Eastport, Maine, facilities. This provided a ready market for local purse-seine caught tuna. Secondly, the new corporation started construction of a small purse seiner at Warren, R.I., to supplement its raw tuna supply. Although the 80-ton capacity F. Nelson Blount did not commence fishing until August 24 (the middle of the tuna season), that vessel and the Silver Mink together produced over 1,000 tons of bluefin tuna by mid-October (table 3). Both vessels fished Cape Cod Bay exclusively. Daily average sizes of fish during July and August were high--180 to over 200 pounds; but in September and October they were noticeably smaller--80 to 85 pounds. School size averaged nearly 18 tons; the smallest schools were less than a ton and contained very few large (300-530 pounds) fish; the largest school was 71 tons of 180-pound fish. Most catches were landed fresh daily, but occasional small catches were held over in ice for 1 or 2 days. The use of spotter aircraft, started in 1959 to locate tuna concentrations, was continued in 1961; planes seldom were used to set the seine around tuna schools.

ATLANTIC COAST EXPANSION, 1962-63

What had been a New England effort, by virtue of the fishery centered in Cape Cod Bay for 4 years, expanded in 1962 to become an Atlantic Coast tuna fishery. Several notable events mark the metamorphosis of the fledgling fishery to major industry stature.

1/During the winter of 1963 the Silver Mink also converted to scallop dragging in Cape Cod Bay waters.

Table 3 - Distribution of Tuna Purse-Seine Catch and Effort by Area and Month, 1958-63[1]

Year	Area[2]	June	July	Aug.	Sept.	Oct.	Total
		A - Catch					
		(Tons)					
		Bluefin Tuna					
1963[3]	4	-	48	-	-	-	-
	5	625	790	-	-	-	-
1962	1	-	-	-	185	-	185
	2	-	116	501	146	166	929
	3	-	-	215	1,047	36	1,298
	4	4	245	718	-	-	967
	5	-	-	-	-	-	-
1961	2	-	51	462	360	159	1,032
1960	2	-	-	207	131	-	338
1959	2	-	-	517	240	-	757
1958	2	-	3	75	107	-	185
	3	-	-	-	-	-	-
	4	-	-	-	-	-	-
		Skipjack					
1963[3]	4	-	66	-	-	-	-
	5	-	38	-	-	-	-
1962	4	-	108	371	-	-	479
Year		B - Effort					
		(Days Fished - All Vessels)					
1963[3]	2	-	9	-	-	-	-
	4	1	50	-	-	-	-
	5	7	68	-	-	-	-
1962	1	-	-	1	16	-	17
	2	1	30	63	48	38	180
	3	-	-	7	54	10	71
	4	6	55	56	-	-	117
	5	-	2	-	-	-	2
1961	2	-	9	30	38	19	96
1960	2	-	-	11	11	-	22
1959	2	-	-	17	14	-	31
1958	2	-	3	8	13	3	27
	3	-	-	1	1	-	2
	4	-	-	3	-	-	3

1/Source: Logbooks and interviews.
2/Areas shown in figure 1.
3/1963 data are preliminary; data not available for August-October.

SKIPJACK: A most important development was the discovery of sizable commercial quantities of a second tuna species, skipjack (Euthynnus pelamis), in the Northwest Atlantic (tables 1 and 3). A series of 17 successful sets between July 30 and August 26, 1962, was the first indication that commercial quantities of skipjack existed in that area. A 479-ton catch was taken 30 miles south of Long Island and Martha's Vineyard (area 4) in surface water temperatures of 69° to 78° F. The two West Coast vessels making the catch had a relatively high average catch of 28.17 tons per successful set (Bureau of Commercial Fisheries 1963).

Available records for 1963 indicated that skipjack were on the Continental Shelf off Cape May, N.J., by mid-July and as far north as the Block Island area by the end of the month. Large fish (10 to 15 pounds) were followed by smaller and medium-size individuals (5 to 10 pounds) and often were mixed with bluefin tuna schools. When surface temperatures reached 78° F. off Long Island, about August 9, the catches declined and did not recover until temperatures dropped to 72° F. on August 28. From August 31 to September 3, skipjack schools, according to reports by fishermen, covered an area of 60-miles square, 40 miles south of Long Island. One airborne observer counted from one position 40 skipjack schools of 200 tons or more each. Surface temperatures were 67° to 70° F. Sizes were between 5 and 10 pounds.

Table 4 - Classification of Purse-Seine Vessels in the Atlantic Coast Tuna Fishery[1]

Class	Capacity	Number of Vessels Operating by Year[2]					
		1963	1962	1961	1960	1959	1958
	Tons						
1	0-50	1	1	1	1	1	1
2	51-100	4	2	1	-	-	-
3	101-200	4	2	-	-	-	-
4	201-300	3	1	-	-	-	-
5	301-400	1	1	-			-
6	Over 400	5	-	-	-	-	-
Total Vessels		18	7	2	1	1	1

1/Classification is that used by the Inter-American Tropical Tuna Commission
2/Data for 1963 include 2 Canadian vessels of 100-ton capacity each.

Records for 4 vessels in July, 8 vessels in August, and 2 vessels in September indicate that the catch per successful set increased markedly until September 9 when the fish left the area. The average catch in July of skipjack (not mixed with bluefin tuna) was 4.1 tons per successful set (7 sets). In August the catch rate rose to 13.3 tons per successful set (49 sets), and in September ended at 34.4 tons per successful set (7 sets).

VESSELS: In 1962, the two small New England purse-seine vessels were joined by 3 medium seiners from the West Coast (two of which were purchased by East Coast interests and two large seiners from West Africa owned by a West Coast tuna canner). The following year the fleet increased to 16 United States vessels and 2 new Canadian purse seiners (table 4). Total capacity of the Atlantic Coast fleet reached 5,525 tons in 1963, five times that of the previous year (table 1). Addition of large-capacity vessels permitted fewer trips at greater distances from landing ports and provided more fishing time in the course of a season.

Several vessels with capacities of more than 400 tons made single trips and landed their catches at Puerto Rico.

Before 1962, the fishing area was restricted to Cape Cod Bay and adjacent waters. This restriction was based primarily on limitations of the small vessels. Their nets were rigged for shoal-water fishing, generally 20 fathoms or less, and were used occasionally in waters as deep as 30 fathoms. In 1962, with the arrival of larger vessels, the fishery was quickly expanded as these vessels explored a wider area and found better fishing than that in Cape Cod Bay. They were able to withstand heavier seas while pursing and brailing and could fish greater depths with their larger nets. Conversely, they had difficulty in fishing Cape Cod Bay waters without reducing the depth of the nets.

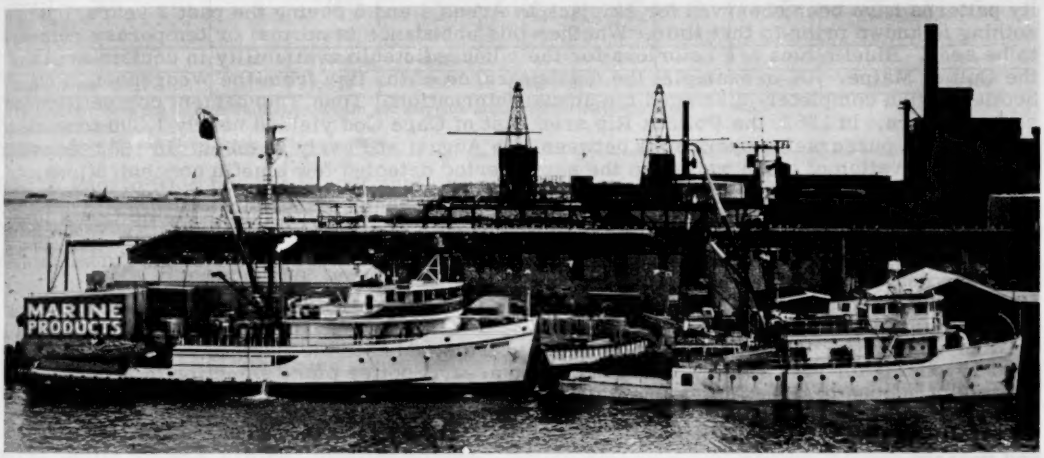

Fig. 3 - Two West-Coast tuna purse seiners, May Queen and Wiley, V.A., at New Bedford, Mass., for unloading during the 1963 season.

The size of the vessels and gear tended to divide vessel classes into two groups, each having greater efficiency in separate fishing areas. Class 1 and 2 vessels (table 4) comprised the group of small seiners which generally worked in Cape Cod Bay and occasionally fished successfully south of Martha's Vineyard during moderate weather. Class 4, 5, and 6 vessels fished outside of Cape Cod Bay for most of the 1962 and 1963 seasons. Class 3 seiners were in a unique position, being able to fish in all areas, with the exception of deep-water areas in rough weather. One of those vessels made a remarkable total catch, in excess of 1,000 tons of bluefin and skipjack, during 105 days of the 1963 season.

The Pollock Rip area east of Cape Cod (Area 3) was highly productive of bluefin tuna between August and October 1962, and the results there clearly illustrate the relative efficiencies of the vessel classes fishing in less protected waters. The catch rates and days fished for vessel classes 1 to 5, respectively, were as follows: 1.1, 3.6, 18.6, 20.0, and 38.9 tons per fishing day in 6, 8, 22, 26, and 9 days of fishing.

FISHING SEASON AND AREA: The fishing season started earlier during the latter part of June 1962 and 1963, and ended later, at the end of October 1963 (table 3). This was 5 weeks more than the 1961 season and nearly 8 weeks longer than in 1958.

The fishing area expanded from Cape Cod Bay in 1962 north to Platts Bank, east to the waters off Pollock Rip, and south to the waters off Long Island and New Jersey (fig. 1). During 1963 the area extended south to Cape Hatteras and included waters off the Middle Atlantic States to the 100-fathom curve. The additional numbers and greater capabilities of the vessels contributed to the expansion, but equal credit is attributed to the use of spotter aircraft

in scouting new fishing areas before, during, and at the end of the tuna fishing season. Aerial surveillance of the Cape May-Norfolk region (Area 5) in June 1963 located an early body of bluefin tuna in an area that was not fished the previous year.

Bluefin tuna generally frequent Cape Cod Bay on an average of 5 months a year, whether they arrive early (May) or late (July). This may be true in other areas where the season begins or ends earlier or later than in Cape Cod Bay, although not enough fishing has been done to clearly show seasonal patterns. Extended fishing time has been the result of shifting the fishing effort to the south where bluefin tuna have been available a month earlier (table 3).

The season and area for bluefin and skipjack availability are difficult to project from one year to the next on the basis of current knowledge and fishing experience. Seasonal availability patterns have been observed for skipjack in Areas 4 and 5 during the past 2 years, but nothing is known prior to that time. Whether this abundance is normal or temporary remains to be seen. Bluefin tuna are notorious for their unpredictable availability in certain areas of the Gulf of Maine. As an example, the disappearance of the fish from the Wedgeport, Nova Scotia, region completely disrupted the annual International Tuna Tournament competition for several years. In 1962, the Pollock Rip area east of Cape Cod yielded nearly 1,300 tons of bluefin from purse-seine operations between late August and early October. In 1963, constant aerial observation of those waters in the same period detected few bluefin concentrations.

FISHING EFFORT: During 1962 and 1963 the purse-seine effort for Atlantic Coast tuna jumped ahead at a prodigious rate. The number of fishing days not only increased, but the average value of the fishing day changed with the increase in average size of the purse seiners and their gear (tables 3B and 4). Experienced captains and crews have accompanied the influx of vessels from Puerto Rico and the West Coast. Less vessel time is needed away from the fishing grounds to unload catches, and operations now are possible under less moderate weather conditions. Aerial scouting, plus the vessels added to the fleet, have reduced time used in looking for tuna schools in the expanded area. Spotter plane selection of accessible schools of adequate-sized fish has reduced lost time resulting from unsuccessful sets. Also, much of the setting now is directed from the plane. Finally, the use of loran navigation systems available on the Atlantic Coast has made possible precise positioning of schools, planes, and vessels.

PROCESSING: More tuna canneries have started operations on the Atlantic Coast to handle the tuna. In 1962, a large Pacific coast salmon and tuna packing corporation established a subsidiary production center at Cambridge, Md. (Pacific Fisherman 1962). The three-line plant, with supporting cold storage for 7,500 tons of frozen fish, is one of the largest tuna canning facilities on the Atlantic Coast. A second Maryland cannery, which has canned imported raw tuna since 1958, began processing Atlantic Coast tuna during 1963. Although much of the supply is imported Japanese-caught Atlantic tuna, an increasing quantity of domestic-caught tuna was processed in 1963 (table 5). Four large canneries now operate in Puerto Rico and, as their requirements increase, Atlantic Coast-caught tuna is supplementing Pacific and foreign supplies.

Table 5 - Canned Tuna Pack by Areas, United States and Possessions, 1961-63 1/

Area	1963	1962	1961
	(1,000 Std. Cases--(48 No. 1/2 Tuna Cans Per Case)		
California	9,064	10,511	10,546
Washington and Oregon	1,449	1,471	1,262
Atlantic Coast	839	765	3/
Puerto Rico	3,464	2/	3/
American Samoa and Hawaii	1,439	2/ 4,271	3/ 3,960
Total	16,255	17,018	15,768

1/Preliminary.
2/Puerto Rican pack included with American Samoa and Hawaii in 1962.
3/Atlantic Coast and Puerto Rican pack included with American Samoa and Hawaii in 1961.
Source: "Fishery Products Report", Fishery Market News Service, San Pedro, Calif., and Fishery Statistics of the United States, 1961.

UNLOADING AND TRANSPORTATION: Changes in handling and disposition of the catch have reflected problems brought on by the rapid development in the past 2 years. The larger vessels with modern refrigeration ability landed catches at six additional Atlantic Coast ports in 1962 and 1963 (table 6). Several trips were unloaded directly at Puerto Rican canneries. Canadian catches were landed in Canada and transshipped to Eastport, Maine, for processing. Shipments of frozen tuna from New Bed-

Table 6 - East Coast Tuna Landings by Port and Species, 1962-63[1]

Port	1963					1962			
	Trips	Bluefin	Skipjack	Unclass.	Total	Trips	Bluefin	Skipjack	Total
	(Short Tons)								
New England:									
Eastport, Maine	2	100	121	210	431	-	-	-	-
Sagamore, Mass.	48	1,002	82	-	1,084	50	684	-	684
Provincetown Mass.	27	405	-	-	405	13	229	2/	230
New Bedford, Mass.	24	646	354	635	1,635	34	1,431	380	1,811
Providence, R. I.	4	336	317	-	653	3	495	90	585
New England Total	105	2,489	874	845	4,208	100	2,839	470	3,310
Mid-Atlantic:									
Jersey City, N.J.	2	758	-	-	758	-	-	-	-
Cape May, N.J.	5	-	-	791	791	-	-	-	-
Cambridge, Md.	3	286	185	-	471	-	-	-	-
Mid-Atlantic Total	10	1,044	185	791	2,020	-	-	-	-
Grand Total	115	3,533	1,059	1,636	6,228	100	2,839	470	3,310

1/Preliminary, does not include Pacific yellowfin and skipjack landed on the Atlantic Coast in 1963.
2/Less than a ton.
Source: Fishery Market News Service, Boston, Mass.

ford to Puerto Rico by "Sea-Land" trailers enabled some vessels to continue fishing during the peak of the season. Several hundred tons of the larger bluefin tuna were exported to the Italian market. Most of the tuna required transportation from dockside to canneries or storage facilities, and this need posed a major problem to the growing industry. The costs, borne by the vessels in most cases, tended to offset the profits made during a short season.

PRELIMINARY SCIENTIFIC FINDINGS

Since the start of continued purse-seine fishing for bluefin tuna in Cape Cod Bay in 1958, the U. S. Bureau of Commercial Fisheries has collected records of catch and effort that pertain to abundance and availability of tuna off the Atlantic Coast of the United States. In collaboration with the Woods Hole Oceanographic Institution, the Bureau initiated in 1962 a tuna purse-seine logbook system, similar to that used by the Inter-American Tropical Tuna Commission in the Pacific.

Table 7 - Atlantic Coast Tuna Purse-Seine Catch Per Day Fished, 1958-62[1]

Year	Area[2]					East Coast
	1	2	3	4	5	
	(Tons Per Day Fished--All Vessels)					
1962	10.9	5.1	18.2	8.3	0	10.0
1961	-	10.8	-	-	-	10.8
1960	-	15.4	-	-	-	15.4
1959	-	24.4	-	-	-	24.4
1958	-	6.9	0	0	-	5.8

1/Data based on logbooks and interviews; for breakdown of days fished in each area, see table 3B.
2/Areas are shown in fig. 1.

It is too early to determine any real effects of fishing on tuna abundance because the fishery has not been stabilized in any one area for a sufficient period of time. Preliminary information from collected data indicates a normal change in the catch rate per fishing day for a new fishery using an undeveloped resource (tables 1 and 7). Very little information is available on the relative abundance or availability of either bluefin or skipjack during those years. Fluctuation in these factors could certainly have had considerable effect on the catch per day's fishing.

The Woods Hole Oceanographic Institution has tagged tuna in the Northwest Atlantic since 1954. About 1,500 tagged bluefin tuna had been released by December 1963. Of 32 recaptures, 25 were taken in Continental Shelf waters from Maryland to Massachusetts. Although the numbers have been small, a significant increase in returns was noted: from 6 recoveries between 1954 and 1962 to 19 in 1963 alone (Mather 1963).

Tag recoveries by tuna purse-seine vessels suggest that in 1963 a group of bluefin tuna in the 100-pound class moved west southwest from Oceanographer Canyon (fig. 1) to coastal waters off Ocean City, Md. (Area 5), then northward and eastward to off Block Island (Area 4), and finally into the Cape Cod Bay area (Area 2); while smaller individuals moved from off Long Island (Area 4) eastward toward Martha's Vineyard (Area 4) and then west again (F. J.

Mather III personal communication). With the exception of bluefin tuna tagged during exploratory long-line cruises farther offshore, most of the marked fish recovered in the 1963 seine fishery were released by cooperating sport fishermen in the seining area since 1960.

Other interesting bluefin tuna tag recoveries are two fish released off Martha's Vineyard in 1954 and caught in the Bay of Biscay in 1959 (Mather 1960), and 5 fish released from Cat Cay, Bahamas, from 1960 to 1962 and taken in tuna purse seine catches off Norway during 1961 and 1962. One of those fish, tagged June 15, 1962, was recaptured August 4, 1962, off Bergen, Norway--a trans-Atlantic crossing of 50 days (Mather 1962b, 1963).

Although these data are fragmentary and subject to the possibilities of chance, they do indicate a need for further investigation and evaluation of the tuna resources of the Northwest Atlantic if we are to determine their commercial potential. Continued observations through exploratory sampling, tagging, and logbook analysis should provide further insight into the distribution, abundance, and movement of the several tuna species known to frequent waters off the Atlantic Coast of the United States.

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HOW TUNA SEE A NET

By Frank Hester* and John H. Taylor**

ABSTRACT

The horizontal sighting range of a submerged object in the sea is physically determined by the attenuation and scattering of light over the path of sight and by the contrast of the object with the underwater background. The former is a measurable quantity alpha which varies with locality in the sea. The latter is determined by the shape and reflective characteristics of the target and by the underwater lighting geometry. In this paper these principles are applied to determine and control the underwater sighting range of tuna seines.

Records of tuna seining operations kept by the California tuna fleet over the past dozen years show that more successful sets are made either in turbid water or at night. It looks as though the success of seining operations is limited in part by the fact that in clear water the fish see the net in time to avoid it. Because of this, we have become interested in finding out how a net is seen by tuna. In this article, we will discuss our preliminary findings, including methods for making nets less visible. Also, an understanding of light in the sea can lead to an improvement in seining strategy which might improve the success of the seining operation even using existing nets.

The visibility of objects under water by humans has been studied intensively for the last decade by the Visibility Laboratory of Scripps Institution of Oceanography of the University of California under the direction of Dr. S. Q. Duntley. Much of the information obtained can be applied directly to our problem. For this reason, a cooperative program has been begun between the U. S. Bureau of Commercial Fisheries Biological Laboratory, San Diego, and the Visibility Laboratory, which will extend this knowledge to help us find out how tuna see a net.

The similarity between our problem of tuna seeing a net and visibility by a human observer is plain. However, our problem is complicated in that we can not yet compare the visual ability of a tuna with that of a human swimmer. Also, previous studies have dealt with the visibility of solid objects, whereas, nets have special properties which we have yet to evaluate. Nevertheless, one can apply the results of the previous experiments with humans and solid objects to tuna and nets and come up with some answers. We can make a good guess as to how the distance at which tuna can see nets varies in different fishing grounds. We can predict how this sighting range will change with sun elevation or time of day and cloud cover. And, finally, we can use this information to point out ways to change the visibility of nets.

Sighting range depends on the distribution of the light field under water, the clarity of the water, the nature or type of object we wish to sight, its position in relation to the observer, and the ability of the observer to see. To predict the sighting ranges of submerged objects we should first learn something about the behavior of light under water.

Those of you who have been under water to free a bait net or clear a propeller will recall that light beneath the surface rapidly becomes dimmer with depth; that the brightness of the water background changes with the path of sight, being brightest when looking towards the surface; and that, even in clear water, objects at a distance seem to blur, their outlines becoming less and less distinct as the distance increases.

The rapid dimming of light as one goes deeper is caused by the absorption of light by sea water. This absorption is greatly increased by dissolved material such as one finds near shore and by the very small plants and animals that grow in the sea and often discolor the water. But, even in the very clearest offshore water, light is rapidly absorbed so that, no matter where one is in the sea, this loss of daylight with depth holds true.

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Absorption of light by sea water, however, is not nearly so important to our problem as is the scattering of light by small suspended particles in the water. Just as the beam of a spotlight or the headlights on a car are reflected back or scattered by fog or dust in the air, so is sunlight scattered by the very small (living and dead) plants and animals and the inorganic material such as sand and silt that are present in the sea. Figure 1 shows how a beam of collimated light, that is, light with parallel rays, is scattered. Most of the beam continues in its direction of travel but some of the light is reflected back and some is scattered in other directions.

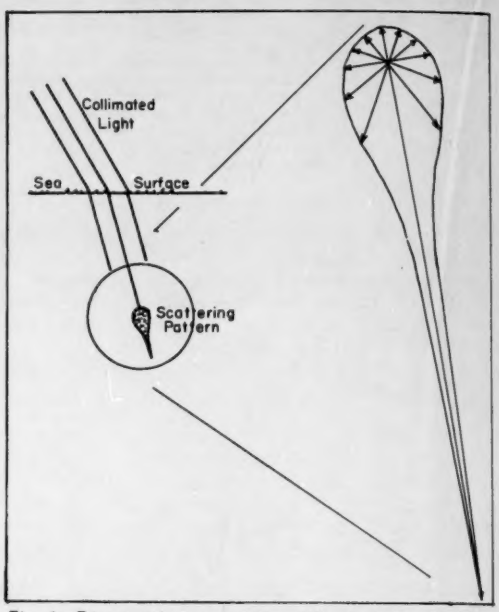


Fig. 1 - Diagramatic representation of the scattering of collimated light by sea water. The length of the arrows in the enlarged picture at the right represents the amount of light being scattered in each direction. By far the greatest amount of light continues in the original direction.

Scattering of light in the sea is very important also in determining the distance at which objects can no longer be distinguished from the underwater background. In fact, scattering is so important that a special instrument has been designed to measure it. This instrument shines a collimated light beam through a known amount of water, usually 1 meter, to a photocell receiver. This receiver is similar in principal to a photographic light meter. By knowing the amount of light at the source and the amount reaching the receiver, the loss of light energy over the known distance between source and receiver can be calculated. This loss is proportional to the loss due to absorption and scattering over that distance. This loss is by custom referred to by the Greek letter alpha (α). The dimensions of alpha can be natural log units per meter or, in our case, per foot ($\frac{\ln}{ft.}$). A quantity like this is difficult to visualize so frequently the value of ($\frac{1}{\alpha}$) is used. This value is called the attenuation length and expresses the distance of water required to reduce the brightness of our light to about its original brightness. For example, alpha in figure 3 is 0.05 ($\frac{\ln}{ft.}$). Attenuation length ($\frac{1}{\alpha}$) then would be 20 feet. This means that if we separated the light from the receiver in our alpha meter by 20 feet the receiver would show that the light was about $\frac{1}{3}$ its original brightness.

Attenuation length is a measure of water clarity. Short attenuation lengths (large values of alpha) are associated with dirty, turbid nearshore water, whereas, long attenuation lengths (small values of alpha) are usually found offshore. The table gives some values of alpha attenuation length measured in the Pacific Ocean.

A surprisingly large number of objects can be seen about four times the attenuation length under water. This is, of course, an approximation and requires certain conditions to prevail. For most dark objects this approximation is very useful in predicting, once alpha has been measured, the underwater sighting range.

If we now combine the two properties of sea water we have discussed, namely, absorption and scattering, a very interesting feature of the underwater light field becomes apparent. Previously, we noted that the brightness of the water background changes, depending on our path of sight. This is because, as the collimated rays of the sun enter the water, some are scattered and some continue in the original direction of travel. All the rays, however, are subject to steady weakening from absorption. Near the surface and looking up, there will be a bright spot corresponding to the position of the sun. As one goes deeper, this bright spot will tend to become less distinct due to scattering.

Surface Values of Alpha (α) and Attenuation Length ($\frac{1}{\alpha}$) at Various Locations in the Pacific Ocean
(The horizontal sighting ranges for many objects in the sea by human observers are about four times the attenuation length. Sighting ranges of tuna nets vary between 3 and $3\frac{1}{2}$ times the attenuation length.)

Location	$\alpha(\frac{\text{In}}{\text{ft.}})$	Attenuation Length in ft. ($\frac{1}{\alpha}$)
San Diego Bay (May 1964)	0.70	1.43
La Jolla (April 1964)	0.18	5.56
Catalina Island (August 1963)	0.06	16.70
(June 1964)	0.16	6.25
Morgan Bank (February 1962)	0.12	8.33
Socorro Island (February 1962)	0.05	20.00
Mexico - off Acapulco (February 1962)	0.04	25.00
Costa Rica Inshore (July 1962)	0.26	3.84
Offshore (July 1962)	0.05	20.00
Hawaii (April 1964)	0.03	34.20

Also, those rays traveling at an angle will have to go farther than those which are scattered straight down and, therefore, they will have been subject to absorption by the water for a longer distance by the time they reach the same depth than the light scattered straight down. At some depth, then, the rays travelling the longer distance will have been absorbed to the point where they are not so strong as the light traveling straight down and the brightest spot in the underwater field will have moved until it is directly overhead. The rest of the light field becomes gradually darker as the path of sight changes from directly overhead to straight down. That this would occur was first proposed over 30 years ago and, in 1960, John E. Tyler of the Visibility Laboratory of the University of California, experimentally demonstrated that this actually does happen. Depending on the amount of scattering and absorption, the depth at which this occurs will vary from a few feet in very dirty water to several hundred feet in very clear water.

We can picture the shape of the underwater light field as approximating an egg. If the observer is inside this egg, the distance from the observer to the shell can represent the brightness of the background for any particular path of sight. The greater the distance to the shell, the brighter the background. On overcast days at all depths, and on sunny days with a zenith sun, or below the depth we just discussed, the brightest area or greatest distance to the shell will be overhead at the zenith and the darkest area will be straight down at the nadir (fig. 2 (a)). The dimensions of the egg will change with depth as will the degree to which it is tipped from the vertical. If we cut the egg with a horizontal plane, we find that the brightness of the background looking in any direction is as represented in figure 2 (c), being a circle in the first case where the egg is upright and an ellipse in the second case where the egg is tipped.

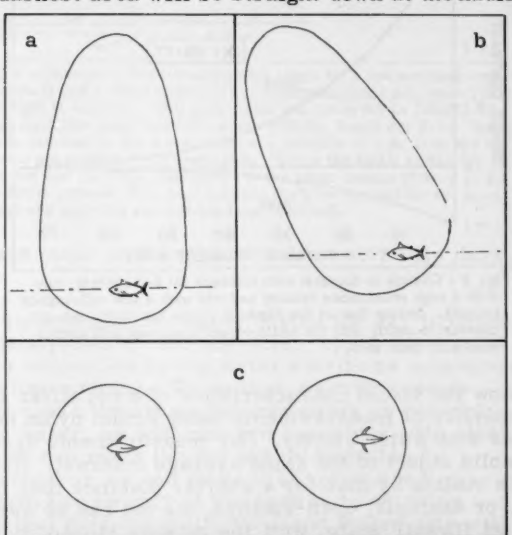


Fig. 2 - A typical shape of the under water light field. The greater the distance from the eye of the fish to the side of the egg the brighter the background for that path of sight. (a) represents the shape on overcast days or for a zenith sun. (b) represents the shape on cloudless days when the sun is not overhead. (c) shows the shape of the field on the horizontal planes indicated by the dotted lines in (a) and (b).

The ability of a human being to distinguish from its background has been the subject of numerous experiments and observations. We are, of course, dealing with a fish, not a man; as noted earlier, we do not know yet how well a fish can see under water. Our problem, however, deals primarily with the ability to distinguish contrasts, that is, to detect differences in brightness, and in this ability, fish and humans are probably more nearly alike than they are in other respects. We will assume for the moment that fish and man detect contrast about the same so that we may come up with some estimates of net-sighting ranges.

Seeing an object means that in some way we can detect a difference between the amount or kind of light energy coming from

various parts of the object and that coming from its background. Under water, where colors rapidly disappear leaving only blues and greens, we are more interested in the difference in intensity rather than color of light energy. We call the difference between the object and its background its contrast. We can assign numbers to contrast by defining it as the brightness of the object, this is, the amount of light being received from the object, minus the brightness of the background, all divided by the brightness of the background. Or, if we call the object brightness B_t and the background brightness B_o, then contrast $C = \frac{B_t - B_o}{B_o}$. From this, you can see that contrast can assume values ranging from minus one (when the object reflects no light at all and the background does reflect light) to some very large positive number when the object reflects a great deal of light and the background does not. In other words, contrast is negative when the object is darker than its background and positive when the object is lighter than its background. Experiments with humans show that objects whose contrasts are equal numerically are seen equally well whether the sign of the contrast is positive or negative. This is to say that even a perfectly black object (contrast -1) will have the same sighting range as a light object with a contrast of +1. (The light object being, therefore, twice as bright as the background.) Since light objects are often several times brighter than their background, they are usually more visible than dark ones.

When both the object and its background are equally bright, contrast is zero and the object is invisible. Actually, with the human and probably the fish, contrast does not have to be zero but only close to zero for an object to be invisible.

Of the many useful observations which have come out of the Visibility Laboratory, perhaps the one which relates changes in contrast to alpha is most important for our problem. Their experiments have shown that, for horizontal paths of sight, the contrast between an object and its water background diminishes exponentially with distance. This change in contrast with distance is shown for a black target and a white target in figure 3. As long as we know three things: The brightness of the target, the brightness of the water background, and alpha, we can calculate the distance at which it will no longer be visible (insufficient contrast for seeing), assuming that we are looking horizontally, that the target is bigger than a certain size, and there is sufficient light. Equally interesting, we can work backward and calculate the brightness an object must have at some specified distance so that it will be invisible against a given background.

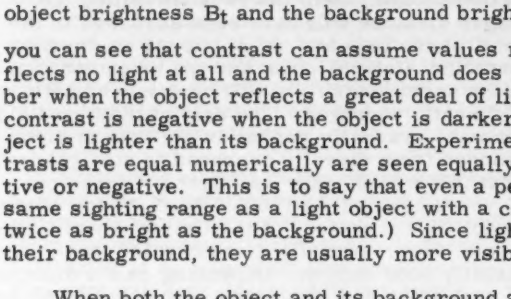


Fig. 3 - Change in contrast with distance for two objects, one with a high reflectance (white) and one with a low reflectance (black). Notice that at the distance where the black object's contrast is nearly zero the white object's contrast still differs markedly from zero.

The preceding strictly applies only to solid objects above a certain minumum size. To date, there has been no attempt to discover how the visual characteristics of a net differ from those of a solid object. We have made a number of measurements using actual nylon net samples to show how sighting distance changes with water clarity. Our measurements agree in general with what we would predict for a solid object of the same average contrast. However, we find that a net with the meshes open is visible by man for a shorter distance than if it is bunched up so that it appears to be solid. For example, open-meshed, the net can be seen horizontally 102 feet away in the clear water off Hawaii while, with the meshes closed, it can be seen 138 feet away. Similar measurements made off San Diego showed that, open, the meshes could be seen 36 feet and, closed, 41 feet away.

If the underwater light field is as in figure 2 (a) so that the background brightness does not change with azimuth, we would expect the sighting range to be the same regardless of the

azimuth of the path of sight. We have seen, however, that on sunny days near the surface, the background brightness does change with azimuth and that the water is brighter in the direction of the sun and darker looking away. As long as the object we are considering has such a low reflectance (looks black) that it is always much darker than the background, its contrast will always be close to minus one and the sighting range will not change greatly with azimuth. This is shown in figure 4 by the curve labeled "net" and corresponds to a newly tarred nylon net with its meshes tightly bunched. The other curve represents the sighting range of a flat white surface that reflects 91 percent of the light falling upon it. This surface is held vertically in the water with its flat side directed toward the observer. You will notice that when viewed in the direction of the sun its contrast is also negative. As its azimuth changes, its surface becomes brighter until its contrast reaches zero at a relative bearing of about 25°. From this point on it becomes brighter and brighter, its contrast now being positive, until, at 90°, it has as great a positive contrast with the background as the dark net does a negative. At this point, the sighting range of the net and the white target should be the same.

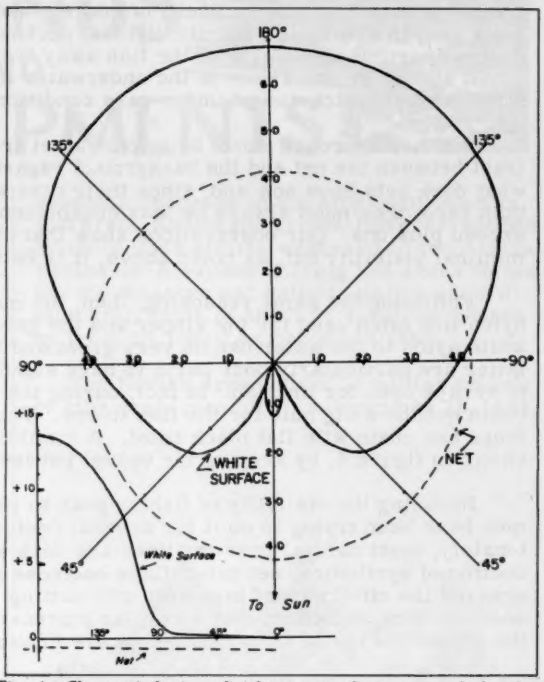


Fig. 4 - Changes in horizontal sighting range for a net sample (meshes bunched) and a white surface (91 percent reflectance submerged) with changes in azimuth. This experiment was made off La Jolla Calif. Sun elevation angle was 58°, α was 0.08/ft. Depth was 30 ft. Changes in contrast for the two samples at a distance of 3 ft. from the observer are plotted at the lower left. Notice the small variability for the net and the large variability for the white surface (from a slight negative contrast when seen between the observer and the sun to almost +14 when the sun is behind the observer).

Between 90° and 180°, the contrast of the white object becomes increasingly positive and the sighting distance exceeds 60 feet. The net curve under the same condition only shows a change of 1 foot between the two extreme positions. This experiment was done off San Diego in April 1964. Had this experiment been done in Hawaiian waters in April, the white surface would have been visible over 215 feet instead of only 60 feet. Generally it is true that light-colored objects such as purse rings, galvanized chain, and expecially white nylon line, are much more visible under water than dark objects.

So far, we have shown that the visibility of an object under water during the day is dependent on its contrast with the background. This is affected by sun elevation, cloud cover, and depth. The distance over which it can be seen is controlled by the water clarity as measured by alpha. This knowledge now can be applied to tuna seining. To do this, we will assume that the way to increase the rate of success is to make the net as inconspicuous as possible. Since the rate of success is fairly high in murky water, we will concern ourselves with clear, offshore waters. Two courses are open to us: we can make the net nearly invisible by matching its contrast to that of the water background or we can make it of transparent material. This second choice may, in the future, prove to be part of the answer to catching skipjack in clear water. However, it is unlikely that existing multi-thousand dollar nets will be abandoned immediately, so we will confine ourselves to considering ways of decreasing the visibility of the nets presently used in the fishery.

The basic idea of camouflage is to hide an object by making it look like something else, often the background. In the case of a tuna seine, there is nothing else to look like but the

background. We want the brightness of the net to match the background brightness as nearly as possible for any path of sight. Since the brightness of the background varies, as we have seen, along different paths of sight, we would have to darken and lighten various portions of the net to match. This, in itself, of course, would not be enough for we would have to make sure that, in setting the net, the lightest portion was between the fish and the sun and the darkest portion on the side of the fish away from the sun. Laying out the net in this manner is not always practical nor is the underwater light field always the same so we cannot hope for a perfect match except under rare conditions.

Another approach would be to pick a net treatment that would result in a negative contrast between the net and the background regardless of the path of sight. Actually, this is what dark nets have now and, since their contrast can never exceed minus one or be greater than zero, they must always be less conspicuous than a light-colored net whose contrast can exceed plus one. Our observations show that existing nets are too dark for them to have minimal visibility but, as noted above, it is better to have too dark a net than too light a net.

Following the same reasoning, then, the most conspicuous parts of the net are the white nylon line often used for the zipper and the galvanized chain and rings. The contrast of the white nylon to the water can be very great and the rings and chain are not far behind. These latter are particularly poor parts to have stand out since they tend to outline the only avenue of escape open for the fish. In fact, during the last few minutes of pursing, the rings and chain outline a big hole for the fish to see. This effect could be reduced by darkening the rings and chain with flat black paint. A similar reduction in contrast could be obtained, as shown in figure 4, by keeping the vessel between the sun and the net.

Reducing the visibility of fishing gear to improve success is nothing new. Trout fishermen have been trying to do it for several centuries, net fishermen for a lesser time. Fortunately, most natural preservatives are dark and this is beneficial. Today, with the introduction of synthetics, net camouflage becomes practical. Monofilament has certainly increased the efficiency of high seas gill-netting. Since vision is perhaps the most important sense to tuna, it follows that a similar increase in success is possible for the tuna fishery if the proper means of visual deception are employed.

TRENDS AND DEVELOPMENTS

Alaska

FOREIGN FISHING ACTIVITY OFF ALASKA, DECEMBER 1964:

U.S.S.R.: The Soviet trawling fleet fishing in the vicinity of Yakutat Bay continued operations through December. It was the first time the Soviets have maintained a fishing fleet in the Gulf of Alaska during the winter. Weather conditions were severe, but they appeared to be fishing for Pacific ocean perch, with little or no catch of incidental species. About 15 vessels were reported in the area during December.

It was reported the Soviets had resumed an extensive herring fishery in the Bering Sea northwest of the Pribilof Islands. In past years this "winter" fishery has involved a fleet of more than 200 Soviet vessels.

Japan: The Japanese shrimp factoryship Chichibu Maru accompanied by 10 trawlers terminated fishing and returned to Japan during the month, according to Japanese sources. That fleet operated in the shrimp fishery mostly in the eastern Bering Sea throughout 1964.

Two large new stern trawlers, the Taiyo Maru No. 82 and the Akebono Maru No. 72, were reported in the eastern Bering Sea during December, with another new stern trawler (Aso Maru) fishing in the vicinity of Adak in the western Aleutian Islands.

* * * * *

1964 ALASKA KING CRAB CATCH AT RECORD HIGH:

Total landings of king crab in Alaska during 1964 were estimated by the Alaska Department of Fish and Game to be more than 85 million pounds as compared with the previous record of 78.7 million pounds in 1963.

Seismic sea waves and land subsidence resulting from the March 27 earthquake crippled crab processing facilities at Kodiak and caused a decrease in the king crab catch in that area. Kodiak fishermen, however, shifted much of their efforts westward to the Alaska Peninsula-Aleutians-Bering Sea areas following the disaster and helped attain a record king crab catch of about 31.1 million pounds--up from 13.7 million pounds in 1963.

The Kodiak area yielded 15 million pounds of king crab from July 1 to December 10, 1964,

Kodiak king crab haul showing large average size.

about 2 million pounds less than the same period in 1963. The Cook Inlet area also showed a decrease from 8.3 million pounds in 1963 to an estimated 7 million pounds in 1964.

* * * * *

FISHERY LANDINGS, 1963:

Fish and shellfish landings in 1963 in the State of Alaska totaled 392.2 million pounds valued at $45.7 million ex-vessel. Compared with 1962, this was a decline of 37 million pounds (9 percent) and $11.5 million (20 percent) largely because of reduced landings of salmon and halibut.

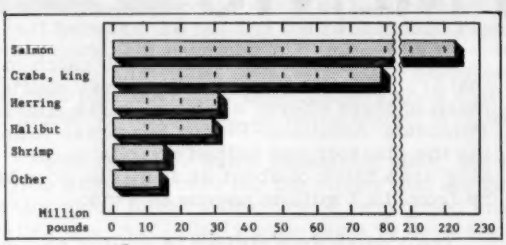


Fig. 1 - Alaska catch, 1963.

Landings of Alaska salmon in 1963 amounted to 223 million pounds--55 million pounds less than in 1962, and 504 million pounds below the record 727 million pounds in 1963. Halibut landings of 30 million pounds declined 7 million pounds (19 percent) as compared with 1962. The 1963 landings of herring (31 million pounds) and shrimp (15 million pounds) declined 2.7 and 1.8 million pounds, respectively.

The decline in 1963 was partially offset by record landings of king and Dungeness crab. King crab landings totaled nearly 79 million pounds--26 million pounds more than in 1962. Dungeness crab landings in 1963 totaled 12 million pounds--an increase of 3 million pounds (34 percent).

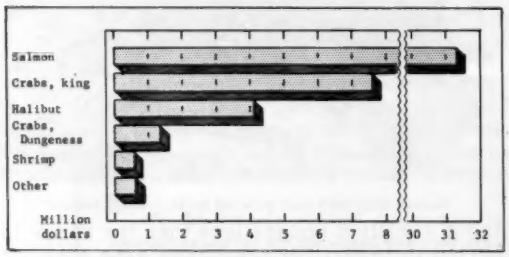


Fig. 2 - Value of Alaska catch, 1963.

Landings were taken by 17,014 fishermen--1,218 more than in 1962. Commercial fishing craft operating in 1963 consisted of 2,286 vessels of 5 net tons and over, and 7,970 motor boats.

In 1963, manufactured fishery products totaled 210 million pounds valued at $109 million--a decline of 38 million pounds and $23 million as compared with 1962.

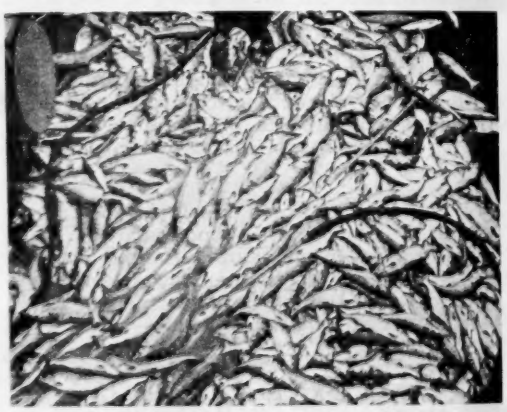
The Alaska canned pack of fish and shellfish in 1963 was 3.0 million cases valued at $76.3 million--775,000 cases and $25.7 million less than 1962. The decline resulted chiefly from a drop in the pack of canned salmon.

* * * * *

FISHERIES HIGHLIGHTS, 1963:

The total Alaska fisheries catch in 1963 was down 9 percent in quantity and 20 percent in value from the previous year due mainly to a drop in the catch of salmon and halibut. The Alaska king crab catch increased sharply in 1963.

Salmon continued to be the major item in Alaska fisheries, accounting for 57 percent of the quantity and 68 percent of the value of the total catch in 1963. Pink salmon accounted for over half of the Alaska salmon catch in 1963. The area breakdown of the total 1963 Alaska salmon catch was 102.4 million pounds in southern Alaska, 93.3 million pounds in central Alaska, and 27.4 million pounds in western Alaska.



Unloading red salmon at a cannery in Bristol Bay.

In 1963, the Alaska halibut fishery was centered in southeastern Alaska while the developing king crab fishery was centered in central and western Alaska.

The 1963 Alaska catch was taken by 17,014 fishermen operating 2,286 fishing vessels (craft of 5 net tons and over) and 7,970 other boats.

Alaska Fisheries Catch, 1962-1963

Species	1963		1962	
	Quantity	Value	Quantity	Value
Fish	Pounds	Dollars	Pounds	Dollars
Halibut[1]	29,886,400	4,160,990	36,791,800	7,466,520
Herring	31,216,200	468,240	33,876,400	379,320
Rockfishes[2]	90,500	6,340	166,200	8,370
Sablefish	1,359,500	125,540	1,508,600	171,920
Salmon: 3/				
Chinook or King	9,160,600	3,126,640	8,738,600	2,698,860
Chum or Keta	35,748,400	3,046,550	57,652,500	4,832,170
Pink	125,117,400	14,472,380	143,278,700	20,296,300
Red or Sockeye	35,455,600	7,643,860	52,946,400	11,130,170
Silver or Coho	17,581,200	3,008,820	15,231,500	3,161,960
Total Salmon	223,063,200	31,298,250	277,847,700	42,119,460
Trout:				
Dolly Varden	4,800	960	4,500	780
Lake	2,200	440	-	-
Steelhead	19,700	3,940	10,000	1,890
Whitefish	600	130	-	-
Total Fish	285,643,100	36,064,830	350,205,200	50,148,260
Shellfish, etc.				
Clam Meats, Razor	410,300	51,950	239,900	78,670
Crabs:				
Dungeness	12,084,100	1,357,540	8,989,500	1,001,450
King	78,740,300	7,607,360	52,782,200	5,278,210
Shrimp	15,126,900	605,080	16,943,100	731,370
Kelp (with herring eggs)	199,100	15,920	46,200	2,310
Other	-	-	11,700	1,380
Total Shellfish, etc.	106,560,700	9,637,850	79,012,600	7,093,390
Grand Total	392,203,800	45,702,680	429,217,800	57,241,650

1/Includes the value of halibut livers and viscera amounting to $6,500 in 1963 and $2,940 in 1962.
2/Includes lingcod.
3/The round weights used in catch tables were obtained by multiplying number of fish by their average weight.
Note: The above data include catches of halibut, sablefish, lingcod, and rockfish landed by vessels of U. S. Registry in British Columbia ports. Round weights of fish taken by halibut vessels were obtained by multiplying reported weights, representing poundage of fish eviscerated and with heads-off, by the following factors: halibut 1.33, sablefish and rockfish 1.43.

In 1963 there were 7,907 persons engaged in wholesaling and manufacturing fishery products in Alaska. Fishery establishments in Alaska included 100 canning plants, 59 fish curing plants, and 66 plants handling fresh and frozen fishery products. Alaska's processed fishery products had a wholesale value of $109 million in 1963.

Alaska's main canned fishery products in 1963 were 2.7 million standard cases of canned salmon valued at $67.4 million; 271,549 standard cases of crab meat (king and dungeness) valued at $7.6 million; and 61,949 standard cases of shrimp valued at $1 million.

Alaska's processed frozen fishery products included principally about 27 million pounds of dressed halibut valued at about $8 million; 13 million pounds of dressed salmon valued at about $6 million; 16 million pounds of king and Dungeness crab products (whole crab, crab sections, and crab meat) valued at about $12 million, and 3 million pounds of shrimp valued at about $3 million.

The 2 million pounds of mild-cured salmon produced in Alaska in 1963 was valued at $2 million.

Alaskan output of industrial fishery products in 1963 amounted to 2,229 short tons of herring meal valued at $285,100 and 4.4 million pounds of herring oil valued at $222,400. (C. F. S. No. 3691, Alaska Fisheries--1963, U. S. Bureau of Commercial Fisheries.)

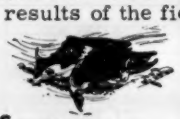
Alaska Fishery Investigations

PINK SALMON FAIL TO SELECT BEST SPAWNING SITES:

Analysis of field data on the 1963 brood-year pink salmon runs in Sashin Creek shows that the spawning fish did not concentrate in areas offering highly favorable environmental conditions for survival of eggs and alevins. In 1963, emphasis was placed on relations between distribution of spawners and survival of their spawn. Spawning density in areas which demonstrated the highest survival of eggs and alevins and produced the most fry per square meter of spawning ground was no greater than in areas which showed relatively low survival, and was even less in one instance. The instantaneous mortality rate of the entire 1963

brood-year population was estimated to be about 40 times greater during the period of spawning than during the period of fry emergence and migration.

Analysis of remaining field data on 1963 brood-year pink salmon in Sashin Creek was near completion and will be followed by reports giving results of the field studies.



American Samoa

MORE TUNA VESSELS FISHING OUT OF AMERICAN SAMOA:

According to informed Japanese industry sources, the number of tuna fishing vessels

operating out of American Samoa has shown a sharp increase. As of December 31, 1964, a total of 68 vessels (40 Japanese, 17 South Korean, and 11 Formosan) were fishing for the two United States packing firms located on that Island, as compared to 54 vessels in mid-November 1964. (Suisan Keizai Shimbun, January 10, 1965.)

California

REGULATIONS ON NET WEIGHT LABELING ADOPTED:

The California Department of Agriculture, Bureau of Weights and Measures, adopted new "Net Quantity Declarations on Packaged Commodities" regulations, which became official as of December 18, 1964. The ruling became effective on labels redesigned and labels prepared from plates made after January 1, 1965, and on all labels after January 1966. California will require at least $\frac{1}{16}$-inch letters and numbers on all small labels up to 25 square inches.

A requirement of the regulations is that "a secondary statement of contents, other than the required statement, is not prohibited, but shall not be placed or designed to be more conspicuous than the required statement."

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PELAGIC FISH POPULATION SURVEY CONTINUED:

M/V "Alaska" Cruise 64-A-6-Pelagic Fish (August 27-September 16, 1964): The objectives of this cruise by the California Department of Fish and Game research vessel Alaska in the coastal waters of central Baja California from Cedros Island to San Martin Island were to: (1) survey the fish and invertebrates of the inshore pelagic environment; (2) determine the amount of recruitment from the 1964 Pacific sardine (Sardinops caeruleus) spawning and to measure the population density of older fish; (3) determine the distribution and abundance of northern anchovies (Engraulis mordax), Pacific mackerel (Scomber diego), and jack mackerel (Trachurus symmetricus); (4) collect live anchovies for racial studies by the U. S. Bureau of Commercial Fisheries Biological Laboratory, La Jolla, Calif.; and (5) take bottom sediment cores for a study of the historical abundance of sardines and anchovies by the Scripps Institution of Oceanography.

A midwater trawl, a blanket net, and visual scouting were used to conduct the survey with all work carried out at night. A total of 41 midwater-trawl and 25 night light-blanket net stations were occupied, and 296 miles were scouted visually. Anchovies were taken on 30 stations, jack mackerel on 17, sardines on 10, and Pacific mackerel on 3. Midwater-trawl stations accounted for all but 2 anchovy, 2 sardine, and one jack mackerel catch. Other common species taken by the trawl in order of occurrence were: midshipmen (Porichthys myriaster and P. notatus), California tonguefish (Symphurus atricauda), Pacific pompano (Palometa simillima), and lizardfish (Synodus sp.).

Poor visual scouting conditions resulted in the sighting of only 16 anchovy, 2 sardine, and 7 unidentified schools. Echo-sounder

operations detected anchovies scattered continuously near the surface over a large proportion of the survey area. The invertebrate catch consisted chiefly of squid which were taken on 29 trawl stations. Salps, pelagic red crabs (Pleuroncodes planipes), ctenophores, and pyrosomes were caught less frequently.

NORTHERN ANCHOVIES: Anchovies dominated the survey both in number of occurrences and in numbers caught. They were distributed over almost the entire survey area except a small portion of Sebastian Vizcaino Bay where sardines were abundant. Anchovies were numerous around Cedros Island and became increasingly abundant from Lagoon Head towards the northern limit of the survey area. They were caught in 28 of 41 trawl tows and at 2 of 25 blanket-net stations. All schools observed or detected by echo-sounder were in a thin layer but covered areas up to 5 miles across. No dense compact schools were observed or fished.

Midwater-trawl catches were mostly light, with only one-half of them containing more than 100 fish. But 10 catches exceeded 1,000 fish and 3 exceeded 30,000, with the largest catch consisting of 100,000 fish weighing 800 pounds. Juveniles ranging from 85-100 millimeters (3.3 to 3.9 inches) accounted for over 80 percent of the total catch.

Anchovy distribution and size composition closely resembled that of the survey made in 1963. Negative phototactic behavior was quite evident on night light-blanket net stations. From this and past experience, it appears that type of behavior is the anchovy's normal reaction to light in the open sea.

PACIFIC SARDINES: Sardines were scarce, and were found mainly in 2 small areas at the southern end of the region surveyed. The 1964 year-class predominated at Cedros Island, where small pure schools of 108- to 126-millimeter (4.3 to 5.0-inch) sardines were present. Several smaller fish were taken mixed with large quantities of anchovies in the same vicinity. The blanket net and midwater trawl each accounted for 2 sardine samples. Adult fish were caught in a small area in the south end of Sebastian Vizcaino Bay. Six mdiwater-trawl catches were made in that area.

During the 1963 survey, sardines were much more abundant and distributed over the entire survey area. The 1964 year-class appears to be weak in central Baja California; this may be due to a southward shift of the sardine population. The eastern shore of Vizcaino Bay, which in former years produced the best survey catches, was almost entirely devoid of fish. Unseasonably cool water temperatures, averaging nearly 8° F. below normal, may have caused the sardines to move southward.

JACK MACKEREL: Small juvenile jack mackerel were caught at scattered locations throughout the survey area. Catches were small, ranging from 1 to 120 fish. The trawl took 16 samples and the blanket net 1. All but one sample was composed of fish-of-the-year. No schools were sighted during night scouting.

PACIFIC MACKEREL: Pacific mackerel were very scarce. Only 3 catches of several fish each were made and no schools were observed during night scouting. Several small schools were observed on daytime anchorages at Blanca and Playa Maria Bays.

MISCELLANEOUS: Live anchovies taken at Cedros Island were delivered to the biological laboratory of the U. S. Bureau of Commercial Fisheries at La Jolla for racial studies. Bottom sediment cores were obtained in deep water for a study of the historical abundance of anchovies and sardines by Scripps Institution of Oceanography.

Sea surface temperatures were abnormally cool for the time of year. They ranged from 20.8° C. (69.4° F.) at Cedros Island to 15.5° C. (59.9° F.) at San Quentin Bay. Temperatures at the same time in 1963 averaged 4.1° C. (7.6° F.) warmer. Weather conditions were ideal only at Cedros Island and north of Punta Baja. Steady and moderate winds over the greater part of Sebastian Vizcaino Bay reduced blanket-net station effectiveness but did not seriously hamper trawl operations.

A rare ribbonfish (Desmodema polystichta) was caught in the midwater-trawl in the north end of Sebastian Vizcaino Bay.

M/V "Alaska" Cruise 64-A-7-Pelagic Fish (September 25-October 13, 1964): The coastal waters of northern Baja California from Punta Baja to the United States-Mexican Border were surveyed during this cruise by the research vessel Alaska. Objectives were to: (1) survey the pelagic environment and meas-

ure the density, age, size composition, and recruitment of inshore populations of sardines, anchovies, Pacific mackerel, and jack mackerel; and (2) to collect live anchovies for blood-genetic racial studies by biological laboratory of the U. S. Bureau of Commercial Fisheries at La Jolla.

The midwater trawl and blanket net were used to sample the pelagic environment. Visual night scouting between stations was conducted to measure the density of fish schools in the immediate cruise area. A total of 32 trawl and 40 light stations were occupied, and 139 miles of ocean were scouted for fish schools. Light and trawl stations were made in the same general areas.

NORTHERN ANCHOVY (Engraulis mordax): As on previous cruises, the anchovy was the most abundant fish species taken. Anchovies were found throughout the cruise area and were caught in 29 of the 32 midwater trawl tows. Night-light stations were not as productive; anchovies were caught at only 3 of the 40 stations. A total of 19 anchovy schools was counted in the 139 miles of ocean scouted between stations. Scouting conditions were generally poor, both because of low bioluminescence in the water and because of dense fog which made scouting impossible on several nights.

There were no detectable size differences among fish caught within the survey area. The size range was 69 to 144 millimeters (2.7 to 5.7 inches), with most in the 90- to 130-millimeter (3.5- to 5.1-inch) range. The smallest fish were caught 1 mile from shore in Bahia Todos Santos, and the largest 10 miles off Punta Santo Tomas. Anchovies were caught throughout the 14° C. to 20° C. (57.2° to 68.0° F.) temperature range encountered on the cruise.

JACK MACKEREL (Trachurus symmetricus): Jack mackerel were the second most abundant fish caught during the survey. They were not taken at any light stations, but were caught in 16 of the 32 midwater trawl tows. Most catches were small with less than 15 fish per tow, although 2,400 were caught in one tow near Punta Descanso. Only 7 mackerel schools were seen during night scouting.

PACIFIC SARDINE AND PACIFIC MACKEREL (Sardinops caeruleus and Scomber diego): A total of 23 sardines were caught at 4 trawl stations between Ensenada and Punta Baja. The size ranged from 181 to 230 millimeters (7.1 to 9.1 inches). No sardine schools were seen between stations. Pacific mackerel were caught at two stations, one trawl, and one light.

Photometer measurements of water clarity taken during the cruise varied between 40 and 100. There was no apparent correlation between catches and photometer readings on this cruise. All trawls were made at night, and presumably, water clarity did not have too great an influence on catch-per-tow.

Airplane Spotting Flight 64-15-Pelagic Fish (October 28-29, 1964): To determine the inshore distribution and abundance of pelagic fish schools, the inshore area from Point Piedras Blancas to the United States-Mexican Border was surveyed from the air by the California Department of Fish and Game Cessna "182" N9042T.

On October 28 the area from Los Angeles Harbor to Point Piedras Blancas was scouted but weather conditions were not the best for aerial scouting. Rain storms were encountered at Piedras Blancas and a high cloud cover over most of the survey area severely restricted water visibility.

A total of 9 northern anchovy (Engraulis mordax) schools were found in Avila harbor. California bonito (Sarda chiliensis) were sighted near Goleta and Point Vicente. Seals and birds were feeding on 7 unidentified fish schools off Pismo Beach.

Red tide was light in intensity near Santa Barbara but quite heavy in the Ventura area. A very heavy oil slick (from natural seepage) covered the waters surface at Coal oil Point. It was the largest and heaviest oil slick seen in that area in two years.

The area from Point Dume to the United States-Mexican Border was scouted on the second day. Weather conditions were fair in the morning and excellent in the afternoon. Small groups of anchovies were seen at Encinitas and Point Vicente. Red tide was heavy in the southern portion of Santa Monica Bay and moderate in a strip just offshore from Seal Beach to La Jolla.

Note: See Commercial Fisheries Review, December 1964 p. 28.

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SHRIMP RESOURCES IN NORTHERN COASTAL WATERS SURVEYED: M/V "N. B. Scofield" Cruise 64-S-5-Shrimp (September 2-16, 1964): The objectives of this cruise in the coastal waters from Zuma Beach, Calif., to Cape Ferrelo, Oreg., by the research vessel N. B. Scofield of the California Department of Fish and Game were to:

1. Make underwater observations of the Gulf of Mexico shrimp trawl in operation and make needed adjustments in doors and net to insure maximum fishing efficiency.

2. Locate concentrations of pink shrimp (Pandalus jordani) for determining population estimates and natural mortality rates.

3. Determine size, sex, and weight of shrimp.

4. Save all cephalopods, rare fish, and invertebrates for the State Fisheries Laboratory, Terminal Island, Calif.

5. Identify and record incidentally-caught fish and invertebrates.

6. Collect stomachs from hake (Merluccius productus) and other species of incidentally-caught fish for juvenile shrimp abundance index study.

One day of the cruise was spent off Zuma Beach, where 2 tows were made in 8 fathoms. SCUBA divers of the California Department of Fish and Game made dives on both tows to observe the net in operation. The doors were functioning satisfactorily, but it was felt that the footrope was fishing too far from the bottom. Chain was added which brought it to within 4-6 inches of the bottom. The chain was later removed after talks with commercial fishermen who reported that they fish their nets about 12 inches off the bottom. At the time those chains were removed, a tickler chain was added to the gear to run about 5 feet in front of the center of the footrope. Moving pictures were taken of the net and the reactions of the fish to the net. The width of the net when fishing was estimated to be 25 feet and the height 6 feet.

A total of 56 tows was made in the combined survey areas as follows: Zuma Beach, 2 tows; Fort Bragg (B-1), 5 tows; Redding Rock-Klamath River, 42 tows; Oregon border, 7 tows. The gear used was a 41-foot headrope Gulf otter trawl with 1½-inch stretched mesh in the cod end. Of the tows made in the shrimp beds, 48 were of 20-minute duration and 6 lasted 30 minutes. On 15 of the tows, a ½-inch stretched mesh liner was used to catch juvenile shrimp and determine escapement of adult shrimp. The tows were made in depths ranging from 8 to 165 fathoms.

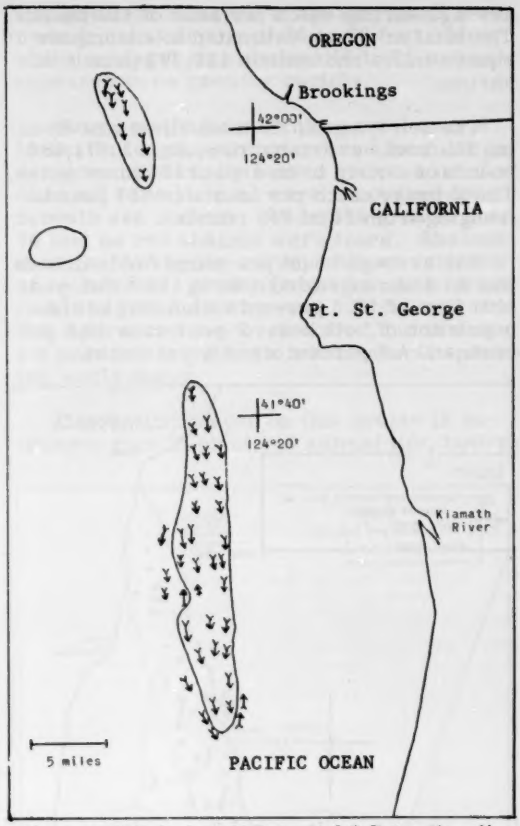

Fig. 1 - M/V N. B. Scofield Cruise 64-S-5-Shrimp (Area A).

An average of 229 pounds of juvenile shrimp an hour was caught in the liner (average heads-on count of 734 to the pound). The average escapement of adults into the liner amounted to 10.8 percent and ranged from 1.0 percent to 44.4 percent. Adults in the liner averaged 110 per pound. About 70 percent of the adults in the liner were 1-year-olds; 29.2 percent were 2-year-olds; and 0.8 percent were 3-year-olds.

AREA A: The 7 tows made on the bed lying on the Oregon-California border yielded an

average shrimp catch per hour of 112 pounds. The total area was estimated to encompass 16 square miles and contain 159,393 pounds of shrimp.

The bed lying off Klamath River and Redding Rock was estimated to contain 1,671,856 pounds of shrimp in an area of 67 square miles. The average catch per hour was 267 pounds (ranging from 50 to 855 pounds).

The average count per pound for both beds was 84 and ranged from 64 to 111. One-year-olds formed 52.6 percent by number of the population of both beds; 2-year-olds 42.5 percent; and 4.9 percent were 3-years old.

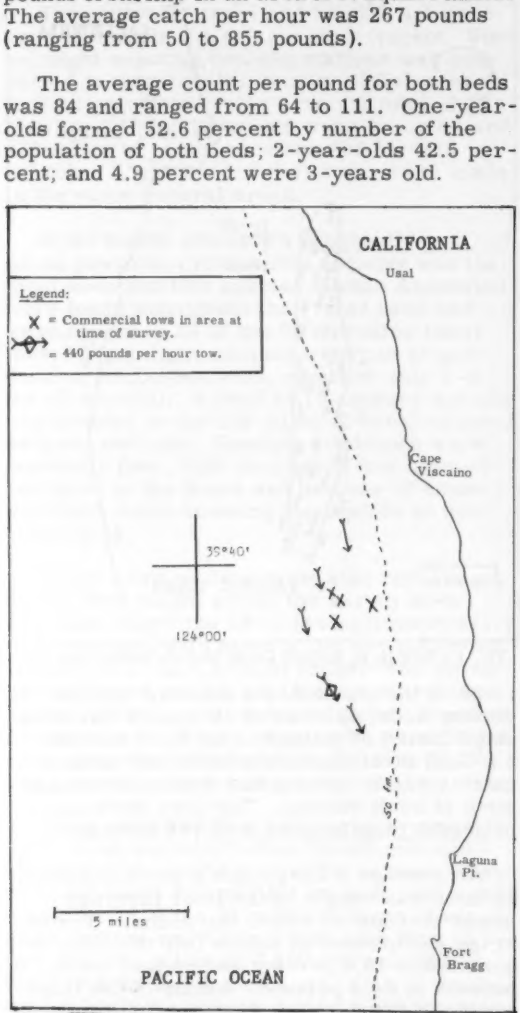

Fig. 2 - M/V N. B. Scofield Cruise 64-S-5-Shrimp (Area B-1).

Head roe was observed in 90.7 percent of the females and 40.3 percent of the transitionals. Incidental fish catches at times were quite heavy. Slender sole (Lyopsetta exilis) appeared in all of the tows. Dover sole (Microstomus pacificus) were in 90 percent of the tows, and greenstripe rockfish (Sebastodes elongatus), longnose skate (Raja rhina), eel pout (Aprodon cortezianua and Lycodopsis pacifica), slim sculpin (Radulinus asprellus), and hake appeared in over 60 percent of the tows. In all, 46 species of fish were identified in the tows.

A total of 28 dogfish (Squalus acanthias) were tagged in cooperation with the American Institute of Biological Sciences shark tagging program.

AREA B-1: Five tows were made on the area B-1 bed. The average catch per hour was 139 pounds with the best tow of 428 pounds an hour located 8.5 miles SSW. of Cape Vizcaino. The count per pound ranged between 77 and 87 with an average of 80.4. One-year-olds formed 44.8 percent by number of the samples taken, 2-year-olds 52.0 percent, and 3.2 percent were 3-year-olds.

Several rare and unusual fish species were saved for special study. A collection was also made of representative invertebrates found in association with shrimp.

Note: See Commercial Fisheries Review, October 1964 p. 18.

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ABUNDANCE AND CONDITION OF DUNGENESS CRAB SURVEYED PRIOR TO OPEN SEASON:

M/V "N. B. Scofield" Cruise 64-S-6 (September 29-October 25, 1964): To determine preseason abundance and condition of legal and sublegal Dungeness crab (Cancer magister) in the San Francisco area for prediction of the 1964/65 season, the coastal waters off San Francisco from the Russian River to Point Montara were surveyed by the California Department of Fish and Game research vessel N. B. Scofield.

Sampling stations during this cruise were selected randomly from the crab areas between Point Montara and the Russian River. Commercial crab traps were baited with squid and rockfish and allowed to fish overnight at each of the 70 stations visited.

A total of 3,593 crab was taken at 70 stations in 694 traps. The catch consisted of 1,929 legal males, 1,422 sublegal males, and 242 females. The average legal catch per trap of 2.78 crabs is the lowest of any preseason cruise. In 1963, 4.3 legal size per

trap were taken and 4.1 in 1962. The sublegal catch of 2.05 was also below the previous year's figure.

The best crab catch was in outer Bodega Bay in 10 fathoms of water. Fair catches were also made in Drakes Bay and off Double Point in 10 and 20 fathoms, respectively. According to the survey, it is believed the crab catch for the 1964/65 season will be 750,000 pounds, with estimates ranging from 600,000 to 900,000 pounds.

About 36 percent of the legal crab taken were soft--much higher than in the past 3 years when around 5 percent were soft.
Note: See Commercial Fisheries Review, January 1964 p. 8.

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ABALONE OBSERVATIONS AND GROWTH STUDIES:

M/V "Mollusk" Cruise 64-M-2-Abalone (September 3-17, 1964): The objectives of this cruise by the California Department of Fish and Game research vessel Mollusk in the coastal area from Pt. Estero to Cambria were to: (1) sample abalone in depths and areas selected at random for: numbers, sizes, gonad development, and sex ratios, and (2) observe relative abundance of invertebrates, vertebrates, and algae found in association with abalone.

During the cruise, 40 diving stations were occupied from Pt. Estero to Cambria, in an area about 7 miles long by $\frac{1}{2}$ to $\frac{3}{4}$ miles wide. An average dive lasted 30 minutes in water from 10 to over 75 feet deep. The area covered on each dive ranged from 100 to 1,210 square yards.

The survey showed there are large numbers of abalone within the area in varying concentration. Abalone density depends more upon ecological characteristics within an area than upon depth. At some stations numerous abalone of all sizes were found at 26-30 feet. At other stations of the same depth, few abalone of any size were observed.

Generally, "legal size" abalone ($7\frac{3}{4}$ inches and larger) were scarce in shallow (0-25 feet deep) waters. The 20- to 25-foot depth has been worked extensively by the commercial divers who, for the most part, have been unable to dive in deeper waters due to the practically impenetrable massive stands of bull kelp (Nereocystis) over most of the area. The greatest numbers of abalone of all sizes were found at depths of 26 to 60 feet. Most of the sublegal size abalone (6 to $7\frac{3}{4}$ inches) appeared to be growing rapidly.

Many small abalone and several over 6 inches in length were recovered from the undersides of partially buried rocks; a number of small ones (1 inch) were recovered from beneath sea urchins. At depths greater than 70 feet no red abalone were found. Abalone sampled during the survey showed evidence of recent shell growth (some as much as an inch) and gonad development. Tests indicated that sperm and ova were active, but it was not possible to estimate when natural spawning would occur.

The area surveyed on this cruise is extremely rich in plant and animal life, both in

Shows diving stations occupied during M/V Mollusk Cruise 64-M-2-Abalone.

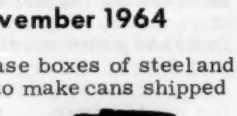
vairety and numbers. A number of different species or sponges, tunicates, and coral were observed as well as large numbers of chitons, sea urchin, and starfish. Numerous fish were present throughout the area. Schools of blue rockfish (Sebastodes mystinus) in two predominant size ranges were noted on almost every dive. The smaller sizes (1 to 3

inches long) inhabited the surface waters while those 6 to 12 inches long were in deeper waters. Lingcod, cabezon, sea trout, and china and vermilion rockfish were also present.

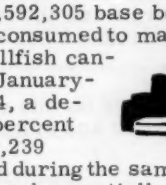
Note: See Commercial Fisheries Review, November 1964 p. 23.

Cans--Shipments for Fishery Products January-November 1964

A total of 2,592,305 base boxes of steel and aluminum was consumed to make cans shipped to fish and shellfish canning plants in January-November 1964, a decrease of 4.6 percent from the 2,719,239 base boxes used during the same period in 1963. The decline was due partially to a drop in the canning of jack mackerel, Main sardines, and shrimp.



Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area 31,360 square inches, equivalent to 112 sheets 14" x 20" size. Tonage figures for steel (tinplate) cans are derived by use of the factor 23.5 base boxes per short ton of steel. (In the years 1962 and 1963, tonnage data were based on the factor 21.8 base boxes per short ton of steel.) The use of aluminum cans for packing fishery products is small.



Central Pacific Fisheries Investigations

ORIGIN AND MOVEMENTS OF SKIPJACK TUNA IN PACIFIC OCEAN STUDIED:

The skipjack tuna is presently an important fishery resource in the Pacific Ocean and is potentially even more important for the future. In recent years, yields of that valuable fish have been about 250,000 metric tons a year. Large fisheries exist off the west coasts of North and South America and near the Japanese archipelago. A small but active skipjack fishery is also conducted in the Hawaiian Islands. The unexploited potential of the skipjack as a resource is demonstrated by the vast unfished areas of the Pacific Ocean where skipjack tuna occur. Large amounts of skipjack exist in those areas. For example, 35,000 metric tons of skipjack were taken in 1937 in the U. S. Trust Territories of the western Pacific Ocean. That area has been virtually unfished for skipjack for nearly 30 years, but a skipjack fishery has recently been reestablished there.

Plastic pool in which skipjack tuna are held for study at the U.S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii. Tank is 23 feet in diameter and has a water depth of 3 feet.

Despite the importance of the skipjack tuna, very little is understood about its biology and population dynamics. In order to learn more concerning skipjack tuna, scientists at the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii, have been studying the origin and movements of the harvested groups of skipjack in the Pacific Ocean. A wide variety of data collected both at the Bureau's Honolulu Laboratory and at other research facilities has been examined. Some of these data involve larval distributions, subpopulation studies, gonad indexes, size distributions, tag recoveries and catch predictions. All of these data have been put together to formulate a model or set of hypotheses which could account for the origin and movement of the harvested skipjack in the Pacific Ocean.

The primary consideration of this model are the skipjack harvested in the eastern Pacific and Hawaiian fisheries. The fish harvested off the coast of Japan are not considered in the model, but they appear to originate from spawnings in the Ryukyu-Izu-Bonon Island chains, or perhaps from spawnings in the islands to the south of those chains.

In the eastern Pacific, it appears that skipjack spawning is negligible, so that skipjack harvested in that part of the ocean must come from somewhere else; the model postulates that those fish come from the central equa-

torial Pacific. Studies of skipjack biology (primarily larval distributions and subpopulations) in the central Pacific have shown it is unlikely that skipjack in the central Pacific comprise a single homogeneous population unit.

The model suggests that of the various population units or subpopulations of the central Pacific, skipjack from spawnings in the central equatorial Pacific contribute the majority of fish harvested in both the eastern Pacific and Hawaiian fishery. Another interesting feature brought out by the study was a possible measure of skipjack year-class strength for the Hawaiian fishery.

The next step in determining the origin and movements of skipjack tuna in the central and eastern Pacific is to test features of this model. Some of those tests are under way.

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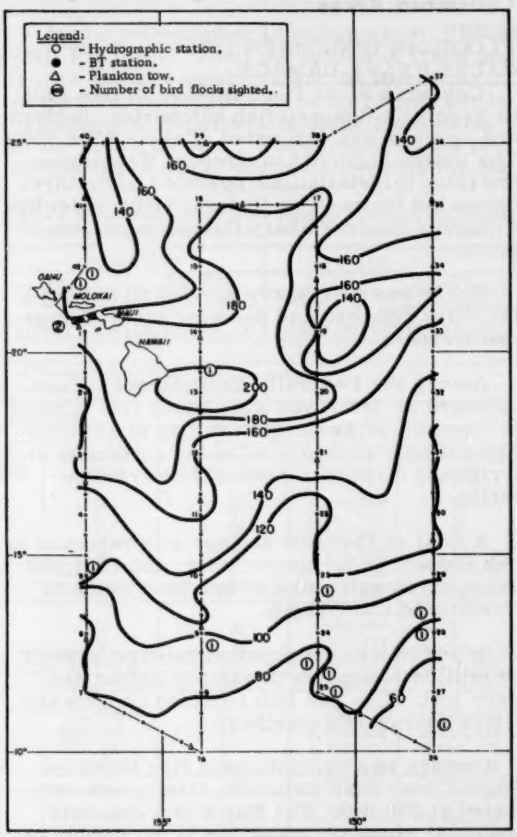
TRADE WIND ZONE OCEANOGRAPHIC STUDIES CONTINUED:

M/V "Townsend Cromwell" Cruise 11 (December 1-20, 1964): This was the tenth in a series of oceanographic cruises by the research vessel Townsend Cromwell to collect data on rates of change in the distribution of properties in the trade wind zone of the central North Pacific Ocean. The research vessel is operated by the Biological Laboratory of the U. S. Bureau of Commercial Fisheries, Honolulu, Hawaii, which on this cruise collected data in an area of the central North Pacific bounded by latitudes 10° N., 27° N. and longitudes 148° W., 158° W.

A total of 43 oceanographic stations was occupied on this cruise. At each station, temperatures and samples for salinity analysis were obtained at 20 depths to 1,500 meters (4,921 feet). Deep casts to 4,000 meters (13,123 feet) were taken at stations 21, 25, and 38.

The surface circulation and temperature distribution in the cruise area during December 1964 showed significant changes from the previous months. The westward flow of water south of 20° N. had broadened and was less intense. Over the entire cruise area the flow appeared to be more random than before. To the north of 20° N. a new set of eddies replaced the previous system in what appeared to have been an eastward shift of the pattern of the 20° C. isotherm depth. The thermocline in the south was less sharp than it appeared in October while the mixed layer for the entire region was somewhat deeper than before. After the sharp drop in surface temperature noted in November, the cooling seemed nearly to have ceased, with the surface temperatures for December almost the same as for the previous month. The temperature pattern was similar to that for November with a very slight temperature drop in the south.

A total of 14 feeding bird flocks were sighted during the cruise as compared to the 23 sighted during the November cruise.



Cruise track chart of Townsend Cromwell, Cruise 11 (December 1-20, 1964), showing depth contours of the 20° C. isotherm in meters.

Bathythermograms (BT) were obtained at 30-mile intervals along the cruise track.

Other operations during the cruise included: (1) obtaining surface bucket temper-

atures and water samples for salinity analysis at each (BT) observation; (2) making dissolved oxygen determinations for each water sample at stations 7A to 16, 26 to 37, and at station 39; (3) releasing 20 plastic-enclosed drift cards at 30-mile intervals along the entire cruise track up to station 38; (4) taking a 30-minute surface plankton tow daily using a 1-meter net; and other observations.

Note: See Commercial Fisheries Review, February 1965 p. 17.

Columbia River

FLOODS IN DECEMBER 1964 CAUSE HEAVY DAMAGE:

Columbia River flood damage in late 1964 to Federally-financed fish hatcheries, ladders, and screens was estimated at about $700,000. The losses occurred in Oregon, Washington, and Idaho to installations operated by the three States but financed by Federal funds under the Columbia River Fishery Development Program.

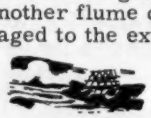
There was also heavy damage to fishery facilities financed and operated by the States themselves.

Among the Federally-financed operations damaged or destroyed were many fish screens in Oregon and Washington valued at $390,000. The screens were placed at the entrances to irrigation ditches to prevent fish from entering.

A total of $103,000 damage was reported to fish ladders in all three States, and $201,500 damage was estimated at fish hatcheries in Washington and Oregon.

In addition to the physical damage, at least 10 million young fish in various hatcheries were lost. The lost fish included chinook and silver salmon and steelhead.

Damage to a recently-built fish flume on Eagle Creek near Estacada, Oreg., was estimated at $20,000. The flume is a concrete and steel structure which the U. S. Bureau of Commercial Fisheries installed in order to test various kinds of fish guiding and collecting devices. Another flume on Grand Ronde River was damaged to the extent of $5,000.



Federal Aid for Sport Fish and Wildlife Restoration

FUNDS APPORTIONED TO STATES, FISCAL YEAR 1965:

A final distribution of $9,560,000 in Federal Aid funds for fish and wildlife restoration during fiscal year 1965 has been made to the 50 States, Guam, the Virgin Islands, and Puerto Rico, the U. S. Department of the Interior announced on January 19, 1965. Those funds come from excise taxes collected on fishing and hunting equipment. They are in addition to the preliminary apportionment of $14,200,000 made earlier and bring to $23,760,000 the total for fiscal year 1965.

Apportionment for Federal Aid in Fish and Wildlife Restoration, Fiscal Year 1965

State	Fish Projects	Wildlife Restoration
	$	$
Alabama	118,049.94	314,665.08
Alaska	349,750.00	835,250.00
Arizona	136,519.49	375,741.55
Arkansas	126,889.01	285,181.51
California	349,750.00	779,786.10
Colorado	169,568.74	428,469.57
Connecticut	69,950.00	83,525.00
Delaware	69,950.00	83,525.00
Florida	148,603.71	257,424.97
Georgia	151,236.83	299,065.99
Hawaii	69,950.00	83,525.00
Idaho	121,711.90	330,815.01
Illinois	181,517.11	415,203.17
Indiana	168,991.16	423,876.95
Iowa	129,940.95	312,599.59
Kansas	119,532.44	335,286.88
Kentucky	94,486.92	236,117.63
Louisiana	83,912.77	274,597.59
Maine	71,096.31	186,486.31
Maryland	69,950.00	114,497.45
Massachusetts	69,950.00	86,310.98
Michigan	252,080.92	629,956.12
Minnesota	328,064.67	460,422.94
Mississippi	103,850.30	265,344.57
Missouri	182,222.19	372,926.60
Montana	167,892.71	508,494.67
Nebraska	105,004.13	314,347.75
Nevada	104,487.95	321,508.53
New Hampshire	69,950.00	83,525.00
New Jersey	69,950.00	98,793.82
New Mexico	127,605.43	382,454.85
New York	184,034.14	529,973.09
North Carolina	104,860.06	353,591.34
North Dakota	69,950.00	231,015.31
Ohio	193,689.61	463,389.86
Oklahoma	150,030.91	303,191.17
Oregon	172,376.46	429,669.30
Pennsylvania	149,724.80	659,727.18
Rhode Island	69,950.00	83,525.00
South Carolina	83,301.00	186,078.01
South Dakota	92,671.00	320,538.80
Tennessee	159,073.69	348,504.30
Texas	349,750.00	835,250.00
Utah	109,496.77	335,980.27
Vermont	69,950.00	90,532.75
Virginia	96,392.21	301,110.70
Washington	134,298.53	347,809.57
West Virginia	69,950.00	177,383.25
Wisconsin	255,123.88	401,162.35
Wyoming	106,961.34	326,841.57
Guam	10,000.00	10,000.00
Puerto Rico	10,000.00	10,000.00
Virgin Islands	10,000.00	10,000.00
Totals	7,025,000.00	16,735,000.00

Of the total amount, $16,735,000 is for wildlife restoration and $7,025,000, which is a record high, is for fish projects.

The Interior Secretary said money apportioned to the States will be used for fish and

wildlife restoration projects involving the purchase of land, improvement or areas of land or water for fish and wildlife, and to conduct research for restoring and perpetuating those resources.

Under the Federal Aid program, the States initiate the projects and, if they meet the requirements established by the Department of the Interior, the funds allocated are used to reimburse the States up to 75 percent of the cost of completed projects.

The amount allocated for fiscal year 1965 under the Federal Aid in fish and wildlife restoration programs is nearly $1 million more than the $22,828,175.62 apportioned in fiscal year 1964.

Note: See Commercial Fisheries Review, August 1964 p. 20; April 1964 p. 14.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-DECEMBER 1964:

December 1964: FRESH AND FROZEN: Purchases of fresh and frozen fishery products in December 1964 for the use of the Armed Forces were up 4 percent in quantity but down 6 percent in value from the previous month. The decline in value was due mainly to lower purchases of peeled and deveined shrimp.

Compared with the same month in the previous year, purchases in December 1964 were up 22 percent in quantity and 49 percent in value. Average prices were much higher for shrimp and scallops in December 1964. Prices were also up for halibut steaks, salmon steaks, and swordfish steaks.

FREEZE-DRIED: Purchases for the Armed Forces in December 1964 included 4,022 pounds of freeze-dried groundfish (cod or haddoc) valued at $4.99 a pound.

January-December 1964 Summary: FRESH AND FROZEN: Total purchases of fresh and frozen fishery products for the use of the Armed Forces in 1964 were up 13 percent in quantity and 16 percent in value from those in the previous year. Larger purchases of shrimp were one of the main reasons for the increase in 1964. Shrimp purchases remained at a high level throughout 1964 in spite of a sharp price increase in late 1964. By the end of 1964, shrimp prices were considerably above those in late 1963.

Table 2 - Fresh and Frozen Fishery Products Purchased by Defense Subsistence Supply Centers, December 1964 with Comparisons

QUANTITY				VALUE			
Dec.		Jan.-Dec.		Dec.		Jan.-Dec.	
1964	1963	1964	1963	1964	1963	1964	1963
(1,000 Lbs.)				($1,000)			
2,041	1,678	26,341	23,400	1,328	894	15,040	13,017

Table 1 - Purchases of Principal Fresh and Frozen Fishery Products by Defense Subsistence Supply Centers, December 1964 with Comparisons

Product	December				Jan.-Dec.	
	1964		1963		1964	1963
	Quantity	Avg. Cost	Quantity	Avg. Cost	Quantity	Quantity
	Pounds	Cents/Pound	Pounds	Cents/Pound	Pounds	Pounds
Shrimp:						
raw headless	33,650	98	1/	1/	1,234,200	1/
peeled and deveined	104,980	134	1/	1/	1,664,304	1/
breaded	385,000	87	1/	1/	4,245,770	1/
molded and breaded	49,000	64	1/	1/	496,620	1/
Total shrimp	572,630	94	518,997	74	7,640,894	7,095,062
Scallops	189,936	77	227,775	57	2,777,486	2,611,957
Oysters:						
Eastern	72,926	108	1/	1/	843,807	1/
Pacific	22,836	77	1/	1/	341,914	1/
Total oysters	95,762	101	83,520	99	1,185,721	1,217,450
Clams	44,200	29	18,786	43	280,183	273,528
Fillets:						
Cod	20,300	32	71,638	30	496,916	683,794
Flounder	204,000	31	206,244	29	3,062,452	2,957,221
Ocean perch	203,000	30	246,622	31	3,522,970	3,786,973
Haddock	131,752	37	73,610	40	1,898,066	2,086,546
Haddock portions	202,750	46	2/	2/	774,072	2/
Steaks:						
Halibut	71,867	49	75,680	38	1,278,144	1,408,900
Salmon	11,270	68	67,226	64	260,825	244,302
Swordfish	2,090	70	3,050	56	17,261	34,258

1/Breakdown not available
2/Not available.

Scallop purchases in 1964 were maintained at a level slightly above the previous year even though scallop prices throughout 1964 were higher than in 1963.

Oyster purchases in 1964 were down slightly from the previous year, although prices for eastern oysters during most of 1964 were below those in the previous year.

Average prices for finfish purchases in 1964 generally showed less fluctuation than those for shellfish. However, the average price for halibut steaks and salmon steaks in late 1964 was up considerably from the same period in 1963.

The average price per pound for the fresh and frozen purchases in 1964 was 57.1 cents compared with 55.6 cents in 1963 and 61.6 cents in 1962.

CANNED: Total purchases of the 3 principal canned fishery products (tuna, salmon, and sardines) in 1964 were up 24 percent in quantity and 23 percent in value from those in 1963 due mainly to larger purchases of canned tuna. Purchases of canned salmon were also up, but purchases of canned sardines were down.

Table 3 - Canned Fishery Products Purchased by Defense Subsistence Supply Centers, December 1964 with Comparisons

Product	QUANTITY				VALUE			
	Dec.		Jan.-Dec.		Dec.		Jan.-Dec.	
	1964	1963	1964	1963	1964	1963	1964	1963
	(1,000 Lbs.)				($1,000)			
Tuna	645	364	5,714	4,367	269	154	2,513	1,990
Salmon	1	1	2,751	2,211	1	1	1,632	1,329
Sardine	11	31	312	489	7	13	181	193

Prices for canned tuna were steady throughout 1964. Prices for canned pink salmon declined in the last quarter of 1964 following an exceptionally heavy pack of that species. On the other hand, prices for canned sardines moved higher in late 1964 after a rather disappointing canning season in Maine.

FREEZE-DRIED: Purchases of fishery products for the Armed Forces in 1964 included small lots of freeze-dried shrimp (priced at about $10 a pound) and freeze-dried cod and haddock (priced at about $5 a pound).

Notes: (1) Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than shown because data on local purchases are not obtainable.

(2) See Commercial Fisheries Review, Feb. 1965 p. 21.

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NEW PURCHASING CONTRACT PROVISIONS ANNOUNCED BY DEFENSE DEPARTMENT

Revised contract provisions covering bids, offers, and quotations on purchases by the U. S. Defense Department have been announced by Headquarters, Defense Subsistence Supply Center, 226 West Jackson Boulevard, Chicago, Illinois 60606. The revised provisions apply to pertinent solicitations issued on and after January 4, 1965. Copies of the revised contract provisions may be obtained from Regional Offices of the Defense Subsistence Supply Center.

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FEDERAL SPECIFICATION PROPOSED FOR FRESH AND FROZEN SHUCKED RAW CLAMS:

A "Proposed Federal Specification for Clams, Raw, Shucked: Fresh (Chilled) and Frozen," has been drafted by the U. S. Bureau of Commercial Fisheries. The specification was developed by the Bureau's Technological Laboratory, Gloucester, Mass., and was based on currently available technical information. The proposed specification has not yet been approved for promulgation and is subject to modification.

Copies of the draft of a "Proposed Federal Specification for Clams, Raw, Shucked: Fresh (Chilled) and Frozen" were distributed to the United States clam industry with the request that comments be submitted by February 1, 1965, to the Technological Laboratory, U. S. Bureau of Commercial Fisheries, Emerson Ave., Gloucester, Mass. Comments received after that date would be considered for inclusion in the next revision or amendment of the specification.

The Bureau was particularly interested in industry comments on the sizes as given in the specification for Class 1 Hard and Class 2 Soft Clams. Since the Military is the largest Government buyer of the items listed, the new specification will include their needs.

Federal specifications are designed to meet the requirements of Federal agencies for purchases of food products. By definition, a specification is an accurate description of the technical requirements for a material, product, or service including the procedure by which it will be determined that the requirements have been met.

Fish Preservation

RESEARCH GRANT TO UNIVERSITY OF WASHINGTON:

The National Science Foundation will contribute $37,050 in matching funds to help the University of Washington expand fish preservation research facilities, Senator Warren G. Magnuson reported November 25, 1964.

The money will be used to remodel the food science area of the Fisheries Center at the University. Fish preservation research at the University involves irradiation and freeze-drying. (Seattle Post Intelligencer, November 26, 1964.)

Florida

FISHERIES, 1963:

Summary: Commercial landings of fish and shellfish at Florida ports during 1963 amounted to 186.2 million pounds valued at $27.7 million ex-vessel as compared with 1962 landings of 186.9 million pounds valued at $30.9 million. In 1963, about 61.5 million pounds were landed on Florida's east coast and 124.7 million pounds were landed on the west coast. From a volume standpoint, the leading species landed in Florida during 1963 were shrimp 39.4 million pounds (heads-on), black mullet (lisa) 35.9 million pounds, menhaden 25.7 million pounds, and blue crab 21.7 million pounds. Sixty-six percent of Florida's total catch in 1963 consisted of those 4 species. During 1963, a total of 14 species of finfish and 4 of shellfish were landed in Florida in quantities greater than 1 million pounds.

Shrimp: In Florida, shrimp continued to be the most valuable fisheries item. Florida shrimp landings in 1963 had an ex-vessel value of $14.0 million compared with $17.1 million in the previous year. The total value of the Florida shrimp catch declined in 1963 even though shrimp landings were greater.

Florida Shrimp Catch (Heads-on) by Fishing Areas, 1962-1963

Area	1963	1962
	(Million Pounds)	
East Coast	4.5	5.2
Tortugas	16.7	14.0
Campeche	12.6	14.9
Upper West Coast	4.1	3.0
Other Areas	1.5	0.2
Total	39.4	37.3

Florida shrimp landings (heads-on) in 1963 consisted of 32.9 million pounds pink shrimp, 4.7 million pounds white shrimp, 1.8 million pounds brown shrimp, and a small quantity of sea bob. The major shrimp-producing areas for the Florida shrimp fleet continued to be the Tortugas grounds off the southwest coast of Florida and the offshore Campeche grounds off the Mexican Gulf Coast.

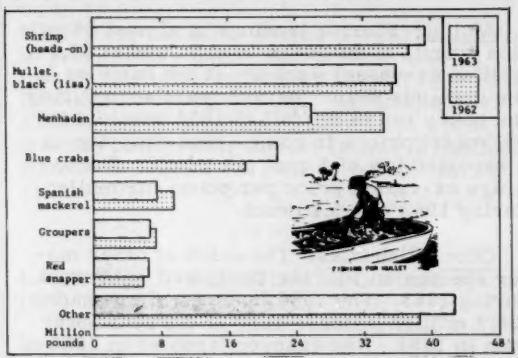

Fig. 1 - Florida landings of fish and shellfish, 1963 and 1962.

Oysters: Florida produced 4.4 million pounds of oyster meats in 1963--a decrease of 13 percent from the previous year's record catch. During the spring months of 1963 landings from public oyster reefs were on a comparable basis with the previous year. However, during the fall season there was a scarcity of marketable oysters.

Blue Crab: The Florida blue crab catch in 1963 totaled 21.7 million pounds with an ex-vessel value of $1.1 million, a gain of 19 percent in quantity and 23 percent in value over the previous year. In 1963, cooked crab-meat production in Florida amounted to 3.4 million pounds with a wholesale value of almost $4 million. Demand for Florida crab meat was good most of the year. Florida crab-meat producers in some instances received crab from other States during the low winter production period.

Spiny Lobster: The Florida catch of spiny lobsters in 1963 was 3.6 million pounds valued at $1.4 million ex-vessel, an increase of 15 percent in quantity and 18 percent in value from the previous year. Demand remained strong all year despite heavy imports of spiny lobsters at Florida ports.

Spanish Mackerel: Florida landings of Spanish mackerel in 1963 amounted to 7.5

million pounds compared with 9.4 million pounds in the previous year. The catch in 1963 was valued at about $700,000 to fishermen. It was not until December 1963 that Spanish mackerel schooled up on the Florida Bay side of the Keys and became available in quantity. During the previous year, most of the catch was made in the Hawks Channel area south of the Keys.

Mullet: Florida landings of almost 36 million pounds of mullet in 1963 valued at $1.9 million ex-vessel were about the same as in the previous year. Market resistance during the heavy run in the fall of 1963 resulted in ex-vessel prices in some areas dropping to a reported low of 1 cent per pound. The average ex-vessel price per pound for mullet during 1963 was 5.2 cents.

Other Fisheries: The catch of other major species in Florida fluctuated somewhat during 1963. The 1963 landings of menhaden (25.7 million pounds) were 25 percent lower than in 1962. Red snapper landings in 1963 of 6.4 million pounds were up 6 percent while grouper landings of 6.8 million pounds in 1963 were down 6 percent. The 1963 catch of 2.3 million pounds of bluefish, 1.3 million pounds of king whiting, 800,000 pounds of pompano, and 3.4 million pounds of spotted sea trout was about equal to the landings of those species in 1962. King mackerel landings (5 million pounds) were up 22 percent. Landings of spot amounted to 1.5 million pounds, a gain of 48 percent over the previous year. Other species of fish and shellfish also showed some up-and-down fluctuations. There were substantial landings of fresh-water catfish, although exact data on that species were not available. Approximately 46 species of edible finfish and 13 species of edible shellfish were landed in significant quantities during 1963 by Florida's commercial fishermen.

Processed Fishery Products: The processed fishery products produced in Florida during 1963 had a wholesale value of $43.8 million. The leading item was frozen packaged shrimp (headless, peeled and deveined, breaded, etc.). Fish fillets and steaks, frozen spiny lobsters, crab meat, and shucked oysters were also processed in substantial quantities.

Imports: During 1963, imports of fishery products through Florida ports became increasingly important. In the last 9 months of 1963, over 15 million pounds of fishery items entered through the Port of Miami. Shrimp in various forms amounted to almost 13 million pounds of that total. Points of origin were in countries in Europe, South America, and as far away as Japan. At least half of the Florida shrimp imports probably consisted of airborne imports. (C.F.S. No. 3602, Florida Landings, 1963, U. S. Bureau of Commercial Fisheries.)

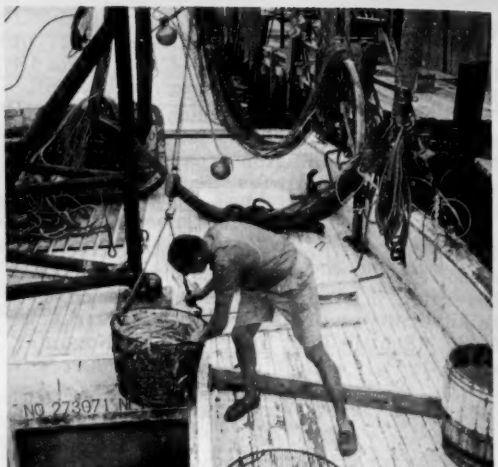

Fig. 2 - Fishing vessel unloading shrimp at a Florida fishing port.

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EXPLORATORY FISHING AND FISHERY INVESTIGATIONS BY RESEARCH VESSEL "HERNAN CORTEZ:"

A variety of fishery studies are being made off the Florida coast by the research vessel Hernan Cortez operated by the Salt Water Fisheries Division, Florida State Board of Conservation. Exploratory fishing is one of the major projects of the Hernan Cortez. Midwater trawl tests are scheduled for early 1965. The vessel is seeking food fish stocks that can be caught cheaply, but in large quantities.

Other work of the Hernan Cortez includes: (1) making a study of the seaweed resource of Florida's broad Continental Shelf, (2) sampling water for phytoplankton and chemical studies related to "red tide," and (3) collecting zootoplankton in connection with studies of the early stages of food fish and shellfish. (Florida State Board of Conservation, December 1964.)

Fluke

FERTILIZED EGGS INCUBATED AT SANDY HOOK MARINE LABORATORY:

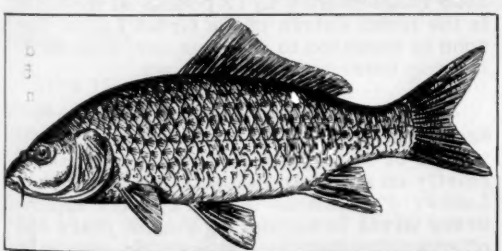
Fertilized fluke eggs are being incubated at the Sandy Hook Marine Laboratory of the U. S. Bureau of Sport Fisheries and Wildlife as a result of a successful cruise by the Bureau's new research vessel Dolphin. In early November 1964, biologists from New York, New Jersey, and Virginia joined Bureau scientists aboard the Dolphin to sample offshore areas between Barnegat Bay and Delaware for fluke spawning areas. This is part of a cooperative program between the U. S. Fish and Wildlife Service and the Middle Atlantic States to delineate the offshore spawning areas and to determine oceanographic factors affecting the movement and survival of young fluke.

Great Lakes

COMMERCIAL FISHERY LANDINGS LOWER IN FIRST HALF OF 1964:

United States Great Lakes commercial fishery landings of 26.7 million pounds for four states (Michigan, Ohio, Pennsylvania, Wisconsin) in the first half of 1964 were down slightly as compared with 26.9 million pounds landed in the same period of 1963. Commercial fishery landings for those four states during all of 1963 were 52.9 million pounds, accounting for about 95 percent of the total United States Great Lakes commercial landings.

Landings for Michigan (9.3 million pounds) and Wisconsin (8.5 million pounds) during the first six months of 1964 were up from the previous year because of marked increases in catches of alewife and yellow perch from Lake Michigan.



Carp range from 2 to 12 pounds and are sold as fresh whole fish; some as fillets, live, smoked; and also used in "gefilte" fish.

Landings of principal species for the period were: alewife 4.9 million pounds from Lake Michigan; sheepshead 3.7 million pounds from Lake Erie; herring 2.2 million pounds from Lake Superior; carp 0.6 million pounds from Lake Huron.

Canada's Great Lakes commercial fishery landings in the first half of 1964 amounted to 13.9 million pounds--down about one-third from the same period in 1963, according to preliminary data. The decline was primarily due to a 41-percent drop in Lake Erie landings (from 17.4 to 10.3 million pounds). Yellow perch landings in Lake Erie were down by nearly two-thirds, from 9.4 million pounds in 1963 to 3.2 million pounds during the first half of 1964.

* * * * *

LAKE TROUT PLANTING PROGRAM IN LAKE SUPERIOR, 1964:

A total of 2.6 million yearling lake trout were planted in Lake Superior in 1964 by participating United States and Canadian agencies. In 1963, plantings of young lake trout in Lake Superior were 2.3 million fish, of which some 2 million were yearling and the remainder fingerling lake trout.

Restoration efforts of lake trout in Lake Superior appeared to be showing good results based on studies made. The trend of improved survival among larger and older fish continued toward the end of 1964, and the incidence of lamprey-wounded lake trout remained at a very low level. As the year came to a close, there were encouraging signs that natural lake trout reproduction may be on the rebound. (Michigan Department of Conservation Bulletin, December 24, 1964.)

Note: See Commercial Fisheries Review, April 1964 p. 17.

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RESTOCKING WORK WITH LAKE TROUT AND SALMON:

Lake Trout: Plans for building up lake trout stocks in the upper Great Lakes are gaining momentum. In the fall of 1964 more than 15 million trout eggs were collected from brood stock at hatcheries of the Michigan State Department of Conservation. Collections in other state, Federal, and Canadian hatcheries will supply another 3 million lake trout eggs. From that total of over 18 million eggs, an estimated $5\frac{1}{2}$ to 6 million yearling trout will survive hatching and rearing for release in Great Lakes waters in

1966, according to the Assistant Director of the Great Lakes Fishery Commission.

Plans call for most of the yearling trout bound for the Great Lakes in 1966 to go into Lake Superior where more than 10 million trout have been planted since 1958.

There is a strong possibility that some hatchery trout will be liberated in Lake Michigan, provided that sea lamprey populations are well enough under control to insure good trout survival.

Intensive efforts to restock Lake Huron are not expected to begin until 1967 at the earliest.

From Lake Superior, the first battlefront in the fight to bring back lake trout populations, studies continue to show signs of success, according to the Assistant Director of the Great Lakes Fishery Commission.

"Trends of improved survival among larger and older fish, which started in 1962, are still holding true," he said. "By the same token, the incidence of lamprey-wounded trout remains at a very low level, reflecting a wholesale reduction of the eel-like predators by chemical treatment in the Lake's tributaries."

In regard to small and medium trout, he said there were good indications that releases of hatchery-reared trout during the last few years had largely offset shortages caused by a lack of natural spawning since 1959.

With more mature fish showing up in sample catches and spawning fairly widespread in Lake Superior, natural reproduction may now be on the rebound. In the Apostles Island area of Wisconsin waters, the number of spawning lake trout in 1964 was 10 times greater than in 1963. (Michigan Department of Conservation, December 17, 1964.)

Salmon: Midwestern fishermen may soon be challenged by the fighting coho (silver) salmon from the Pacific. A bold plan is underway to bring this famous game fish from the Pacific fiords to the Great Lakes. The Oregon Fish Commission in January 1965 provided the State of Michigan with 500,000 fertilized coho salmon eggs. They were flown in from Oregon and will be reared at state-operated hatcheries in Oden and Harrietta as introductory planting stock in the upper Great Lakes. Michigan may get another 500,000 fertilized coho eggs from other West Coast hatcheries. Fish from those eggs will be hatched and reared to the size of 6 inches before their release in the upper Great Lakes, which is scheduled for late fall or spring 1966.

The Michigan State Department of Conservation plans to release coho salmon in the Great Lakes for 3 years. The aim is to establish runs of adult fish in waters where they can be captured for spawn-taking purposes. Hopefully, too, some natural reproduction will occur.

As with any attempt to introduce a new species, success of the coho program is not a sure-fire thing, but fisheries men are optimistic about its chances. A Michigan fisheries official said, "From what we've learned about the coho, we think this program is going to click. At any rate, it's worth shooting for."

The coho plantings are tied in with the broad effort to rebuild sport fishery stocks of the Great Lakes to the level that existed before 1945. Boosting hopes for the sport fishery are the success of lamprey control and lake trout restoration work in Lake Superior, and the promising prospects for similar results in Lake Michigan and Lake Huron.

The timing of coho spawning runs should supplement migrations of trout to provide a longer fishing season.

The coho dies after spawning once, usually in its third year. In western streams, coho range from 6 to 12 pounds at maturity. In the fresh waters of the Great Lakes, the coho is expected to run smaller, probably ranging between 3 and 6 pounds.

The coho feeds on plankton at an early age and then shifts its diet to fish during its second or third year. It is expected to feed chiefly on smelt and alewife in the Great Lakes. Populations of alewife have exploded in the Great Lakes during recent years and offer an abundant food supply for coho salmon. (Michigan Department of Conservation, December 19, 1964.)

Gulf Fishery Investigations

SHRIMP DISTRIBUTION STUDIES:

M/V "Gus III" Cruise GUS-24 (December 8-19, 1964): The best catches of brown shrimp were made in area 20 during this cruise by the chartered research vessel Gus III. The cruise was another in a series of cruises of a continuing shrimp distribution study in the Gulf of Mexico conducted by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex.

Although bad weather hampered trawling operations in the survey area, a total of 28 tows with a 45-foot Gulf of Mexico flat trawl was made. In addition, 63 plankton tows, 41 bathythermograph, and 167 water (Nansen bottle) samples were taken. Drift bottles cast at 27 stations during the cruise totaled 162.

All of the 8 statistical areas worked during this cruise yielded fair to moderate quantities of brown shrimp of various sizes. The largest catch from area 20 yielded 45 pounds of 31-40 count shrimp from the 10- to 20-fathom depth and 33 pounds of 15-20 count shrimp from over 20 fathoms. That area also yielded a few pounds of large white shrimp and a scattering of pink.

Area 19 yielded 33 pounds of 31-40 count brown shrimp from the 10-20 fathom depth. No shrimp were caught in the other two depth ranges of the area.

A fair quantity of 15-20 count white shrimp (27 pounds) was taken in the 10-20 fathom depth range of area 13. The up to 10-fathom depth yielded 17 pounds of smaller white shrimp, and 9 pounds of brown 26-30 count brown shrimp was caught in the over 20-fathom depth.

Area 17 yielded some 50 pounds of 26-30 count brown and white shrimp about equally divided from the up to 10- and over 20-fathom depths.

Brown shrimp catches predominated in area 18--a total of 33 pounds of 15-20 count and smaller from the 10-20 and over 20-fathom depths. A few pounds of pink also were taken from that area.

Note: (1) Shrimp catches are heads-on weight; shrimp sizes are the number of heads-off shrimp per pound.
(2) See Commercial Fisheries Review, February 1965 p. 25.

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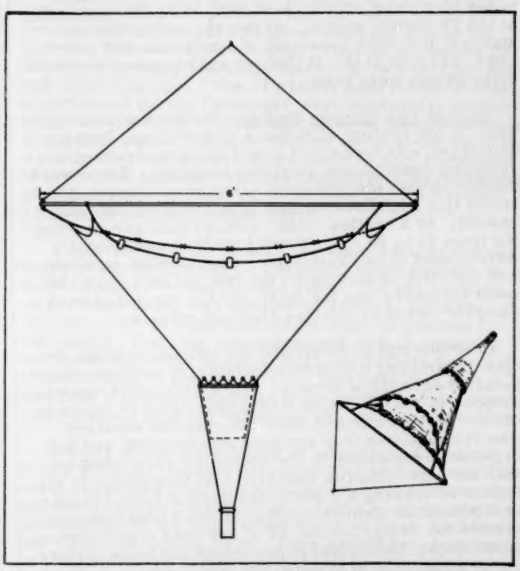
Some of the highlights of studies conducted by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex., during October-December 1964:

SHRIMP BIOLOGY PROGRAM: Shrimp Larvae Studies: Larvae of the pink shrimp, Penaeus duorarum, were reared to postlarvae and those of the rock shrimp, Sicyonia dorsalis, to first protozoeae.

Work to ascertain the effects of various environmental conditions on larval development of the brown shrimp, P. aztecus, continued. In two experiments to determine the effects of salinity, the larvae did not live beyond the first protozoeal stage. One temperature experiment was also completed. Larvae reared at 18° C. (64.4° F.) and 32° C. (89.6° F.) died at the molt to first protozoeae. Development, however, was successfully completed at intermediate temperatures, the first postlarval stage being reached in 15 days at 24° C. (75.2° F.), in 12 days at 27° C. (80.6° F.), and in 11 days at 30° C. (86° F.).

Examination of 82 plankton samples collected in July and August 1963 revealed planktonic-stage penaeids to be considerably more numerous in the western (Galveston-Brownsville) than in the eastern portion (Galveston-Mississippi River) of the sampling area. Seasonal abundance, however, showed an overall increase in all areas.



A net designed to catch postlarvae shrimp in shallow areas along the shore. One man wading can easily handle the net.

Similarly, planktonic stages of Penaeus spp. were 6 to 7 times more abundant in the western sector than in the eastern, with a general increase in seasonal abundance in all areas. Although planktonic-stage Penaeus spp. occurred at all stations, greatest concentrations were found at those located inside 25 fathoms. Analy-

sis of monthly catches by planktonic stage revealed that advanced stages (Mysis and postlarval) predominated in the east, whereas earlier stages (nauplial and protozoeal) prevailed in the west. This observation, in addition to the greater abundance noted in the west, indicates that spawning was considerably more intensive in Gulf waters west of Galveston.

In our continuing investigation of the possibility that postlarval Penaeus spp. concentrate on the bottom prior to their movement into nursery areas, a modified Clarke-Bumpus sampler was mounted on a sled so that its net fished approximately 5-6 inches above the bottom. The performance of this gear has been good and results obtained with it appear promising. In November 1964, its sampling efficiency was compared with that of the Gulf-V plankton net.

Although Penaeus spp. postlarvae were neither taken at upper levels of the water column with the Gulf-V sampler nor on the bottom with the Clarke-Bumpus net, large numbers of Trachypeneus spp. and Sicyonia spp. larvae, postlarvae, and juveniles were caputred in both regions.

Young shrimp were caught in the water column with the Gulf-V net at only the 15- and 25-fathom stations, their relative abundance increasing with depth and temperature. These shrimp consisted entirely of protozoeal- and mysis-stage larvae. In contrast, the numbers of shrimp taken just off the bottom with the Clarke-Bumpus net increased from the 4½-fathom station out to the 15-fathom station, with none being encountered at the 25-fathom station. At the 4½- and 7½-fathom stations, the catch consisted of postlarvae and juveniles, whereas at the 15-fathom station many advanced-stage myses were taken.

Florida Bay Ecology Studies: During the quarter, work on the ecology of juvenile pink shrimp, Penaeus duorarum, was concerned primarily with developing sampling methods and selecting locations. Tests were conducted with the unit-area sampler on various substrate types in Biscayne Bay (Fla.) with encouraging results. At a shallow-water site, 40 pink shrimp ranging from 40 to 80 mm. (1.6-3.1 inches) total length were placed in two samplers. The chlorine repellent was effective in moving all the test animals from the main enclosure into the small trap at the end of each sampler within 15 minutes after its release.

In an attempt to determine the efficiency of the device in sampling a natural population of shrimp and associated animals, a sampler with a removable top was dropped in shallow water where shrimp were known to occur. Fifteen minutes after the chlorine repellent was released, the trap entrance was blocked, and the organisms remaining in the enclosure were removed with dip nets. Results indicated that this device is effective in drawing a quantitative sample from the natural population when fished on substrates where shrimp are not too deeply buried, or where very small shrimp do not occur. Additional experiments are being carried out in an attempt to broaden its usefulness.

If possible, indices of Penaeus postlarval abundance will be developed from material collected in the area now being surveyed. Postlarval penaeids, though not abundant there during the month of December, were occasionally taken with the small beam trawl whose bag was fitted with an extra-fine-mesh cover.

Abundance and Distribution of Larvae of Pink Shrimp: A single cruise, representing the final stage of field work on this project, was undertaken during the quarter. Forty-two stations, distributed in a grid pattern over the Tortugas Shelf, Florida Bay, the Florida Straits, and Hawk Channel, were occupied. The object of the cruise was to obtain a semi-synoptic picture of larval distribution patterns over a wide area of the Tortugas Shelf. At the same time, 240 seabed drifters were released, but returns (only 7 to date) have been poor. Since the majority of release sites were situated to the northeast of the principal trawling grounds, the lack of returns may, however, have significance in indicating the direction in which water currents do not generally move. (Conducted by University of Miami under contract.)

Juvenile Phase of the Life History of the Pink Shrimp: Samples of juvenile pink shrimp migrating out of Whitewater Bay via Buttonwood Canal, Flamingo, Fla. (Everglades National Park Nursery Grounds) have been collected monthly from January 1963 through December 1964. Although shrimp were taken in every month, their numbers varied greatly. In 1963, three peaks of abundance were observed, one each in January, April, and September. The latter two were the greatest and about equal in amplitude.

In 1964, however, only two peaks occurred, one in March and another in June, both of which were larger than those of 1963. The June peak was the largest and nearly three times greater than any of the peaks in 1963. It appears that peaks of juvenile abundance can occur in spring, summer, and early fall. The periods of lowest abundance occurred in late fall and winter, and in the spring. Shrimp associated with peaks in abundance were somewhat smaller than the overall average, which was about 14 mm. in terms of carapace length. In June 1964, when greatest numbers were recorded, the average carapace length was 10 mm. or 0.39 inch. (Conducted by University of Miami under contract.)

SHRIMP DYNAMICS PROGRAM: Surveys of Postlarval Abundance and Fisheries for Bait (Juvenile) Shrimp: Sampling for postlarval shrimp continued during the quarter at four locations along the Texas coast. As is normally the case at that time of year, the number of postlarvae in sample catches dropped sharply at all locations. One unusually large catch for the season was made at Gilchrist (Tex.) on December 2, however, when 110 postlarval brown shrimp were collected.

In October-November 1964, commercial bait shrimp production in the Galveston Bay area dropped 24 percent from that recorded for the same period in 1963. During that period the harvest of bait-size brown shrimp decreased 75 percent. Juvenile pink shrimp were unusually abundant in Galveston Bay during 1964. Landings of that species for bait (mostly during mid-year) totaled 10,900 pounds, surpassing the combined catch of small pink shrimp over the previous 5 years. Due probably to uncommonly mild weather, bait shrimp (practically all white shrimp) remained plentiful well into December.

Commercial Catch Sampling: Catch-sampling activities in Texas and Louisiana declined during the quarter due to a seasonal decrease in shrimp abundance and consequent lull in fishing operations. Interview information indicated that heaviest concentrations of brown shrimp were present in 15 to 20 fathoms south of Freeport (Tex.), and of white shrimp in 2 to 5 fath-

oms between Freeport and Morgan City (La.). Few small shrimp of either species were discarded at sea.

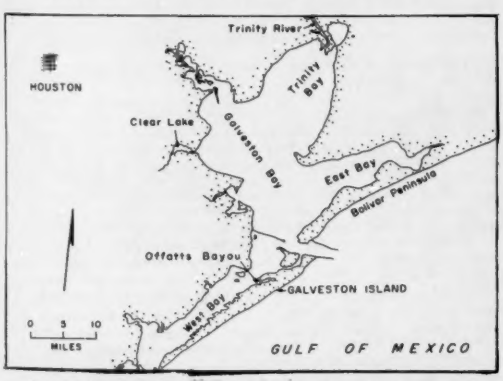
The shrimp fleet at Key West (Fla.) increased in size from 87 vessels in early October to over 200 by

Comparison of Bait Shrimp Catches from Galveston Bay for the Final Quarters of 1964 and 1963

Month	Year	Catch	Catch/ Effort	Distribution by Species		
				Brown	Pink	White
		Lbs.	Lbs./Hr.	. . .(Percentage). . .		
October	1964	101,200	31.7	7	0	93
	1963	178,900	42.5	20	0	80
November	1964	59,300	28.1	3	0	96
	1963	32,200	22.4	5	0	95
December	1964	. . . . Data not yet processed				
	1963	3,600	13.3	0	0	100

the end of December. Although fishing operations were hampered by rough seas during the quarter, production exceeded that for the same portion of 1963. The installation of machine-grading devices by several shrimp processors in the Key West area is thought to have influenced the culling practices of Tortugas shrimp fishermen. Only half as many small shrimp were discarded at sea in the last quarter of 1964 as during the same period in 1963 (4.4 percent of the total weight caught in 1964 against 8.8 percent in 1963).

Migrations, Growth, and Mortality of Brown and White Shrimp: Returns from the brown shrimp mark-recapture experiment initiated in June off Freeport (Tex.) appear to be complete with 166 tagged individuals (8 percent of the number released) recovered. Ten of those shrimp had been at liberty more than 80 days and had traveled an average distance of less than 15 miles from their release sites, as compared to 13 miles for shrimp recovered within 80 days of release. During the season and in the area involved, it appears that adult brown shrimp do not move great distances.



In mid-August, 3,384 stained shrimp were released in 13 to 17 fathoms off Freeport. To date, 263 (8 percent) have been returned. The distribution of those recoveries indicates little offshore movement in August and September. Only 4 shrimp were recovered beyond 20 fathoms, although considerable fishing effort was expended at greater depths. Coastwise movement also was minimal and the majority of recaptured shrimp were taken within the release area. Mortality estimates for the marked population are being computed.

Population Studies: The influence of mesh size on the fishing characteristics of shrimp nets was investigated by attaching echo-sounding transducers to the otter boards of the experimental trawls. Earlier measurements of change in the spread of the otter boards resulting from differences in net-mesh size were partially confirmed. The transducers are presently being modified to allow measurement over a range of vessel speeds. It is anticipated that future experiments will provide an explanation for the occurrence of more large shrimp in the catch of nets constructed with large meshes than in nets with small meshes.

Catch data from recent cruises permit general inferences to be drawn concerning the reliability of trawls as sampling gear for adult shrimp. On several occasions, three trawls of similar construction have been towed simultaneously by our research vessel. Differences in the number of shrimp caught by the three nets have been slight when fishing was done in offshore waters. The small variance associated with these catches is believed to indicate that each of the trawls caught a constant and representative portion of the population present. Similar trials conducted in shallow bay waters produced comparable results when shrimp population densities were relatively low. At high population densities, however, differences in the catch of the three nets were often as great as 50 percent, presumably as a result of the nonuniform distribution of shrimp on the fishing grounds.

ESTUARINE PROGRAM: Ecology of Western Gulf Estuaries: The bay anchovy was the most numerous species taken in trawl biological samples during the quarter, followed in descending order of abundance by the white shrimp, Atlantic croaker, brown shrimp, sand sea trout, and spot. The relatively high temperatures experienced during December were apparently responsible for the exceptionally high catches made in the middle of that month. Sample catches of the above species were up 20 percent over those made in mid-December of 1963. The increase was due primarily to larger catches of Atlantic croaker and white shrimp which increased 170 and 48 percent, respectively.

Young-of-the-year Atlantic croaker entered the estuary in November and by December were present in large numbers throughout the area. The bay anchovy, on the other hand, was present in greatest numbers in October, with catches declining almost 80 percent by December. Heaviest concentrations of both croakers and anchovies were found in East and Trinity Bays. It is interesting to note that during that period in both 1963 and 1964 a marked decrease in anchovy numbers coincided closely with the buildup of the croaker population.

A study of the distribution of juvenile and subadult brown shrimp (sampled with a 10-foot shrimp trawl) is being conducted to supplement the study of postlarval and early juvenile distribution. Juvenile shrimp tend to concentrate in the shore-zone areas of East, Trinity, and Upper Galveston Bays. They were first observed in the lower bays during early April (postlarvae were first observed there in late March), but were not captured in the upper bays until 2 weeks later. This time lag corresponds closely with the time required for postlarvae to arrive in the upper bays after their appearance in the lower bays, and suggests that the postlarvae grow very little prior to their arrival in the peripheral nursery areas of the bays.

Interestingly enough, the subadults, when moving toward the Gulf, did not use the Houston Ship Channel as did the immigrating postlarvae, but instead moved along the shore and in the open waters. When they reached

the tidal pass, however, they entered the Channel and followed it in their return to the Gulf.

INDUSTRIAL BOTTOMFISH FISHERY PROGRAM: Life Histories of Central Gulf Bottomfish: Growth measurements for Atlantic croaker representing the 1958-63 year-classes were derived from a fairly large volume of weight frequency data. The data indicate that growth is rapid during the first 3 years of life, the percentage increase in weight during the second year being more than twice the increase exhibited in the third.

Analysis of size-frequency data from commercially caught croaker revealed that individuals are first recruited to the fishable stock (in the Gulf near Mobile Bay) during June when approximately 9 months old and at an average size of 11 cm. (10 g.). By September, yearling fish about 12 months old and sexually immature average 13 cm. (20 g.). Collections by personnel of the Alabama Marine Resources Laboratory revealed that yearlings of comparable size (12 cm. and 15 g.) are present during October in Mobile Bay. They apparently remain in the bay throughout the winter and spring, being eventually recruited to the fishery the following summer. At this time they are about 21 months old and average 14 cm. in length (30 g. in weight). Yearling fish, recruited to the stock during the previous year and also contributing to the summer fishery are somewhat larger 15.5 cm. and 35 g.).

These observations indicate that part of a year-class may not contribute to the offshore fishery until almost a year after its members attain commercial size. Rapid growth during this interval in the estuary and nearby Gulf results in more than a threefold increase in the average weight per recruit to the fishery. In the remainder of the year-class, recruitment and exploitation are coincident and occur when the average fish is almost 2 years old.

Commercial Catch Sampling: A method to determine optimum bottomfish grounds in the north-central Gulf employs seasonal indices of mean annual bottomfish abundance (catch per hour) for the 5-year period 1959-63, and associated coefficients of variation. The area with the highest average abundance and the lowest coefficient of variation represents the ground where, over the years, average fishing success has consistently been greatest.

Area	Average Annual Abundance 1959-63	Coefficient of Variation
	Tons per Hour	Percentage
Nearshore (Apr.-Sept.):		
East of Delta	0.71	19
West of Delta	0.61	31
Offshore (Dec.-May):		
East of Delta	0.46	26
West of Delta	0.45	21

By this means of assessment, the nearshore area east of the Mississippi River Delta proved to be the most productive bottomfish ground. Although fish abundance on the nearshore ground west of the Delta was relatively high (0.61 ton per hour), its annual variation was the greatest of all four areas. The offshore grounds (Dec. to May) contained smaller concentrations of bottomfish than the nearshore grounds (Apr.-Sept.). Year-to-year variation in the magnitude of offshore stocks was intermediate between comparable measures for nearshore grounds east and west of the Delta.

Note: See Commercial Fisheries Review, November 1964 p. 43.

Industrial Fishery Products

LEVEL OF FISH MEAL UTILIZATION IN NEW ENGLAND POULTRY RATIONS:

Mixed feed producers and experiment stations in a number of New England States (Maine, Massachusetts, and New Hampshire) as well as some fish reduction plants in Maine were visited in early December 1964 by a nutritionist of the U.S. Bureau of Commercial Fisheries Technical Advisory Unit, Boston, Mass.

Observations of the nutritionist during those visits and his conclusions follow:

With one notable exception, the levels of fish meal utilization in New England poultry rations are relatively high. The levels presently recommended by the New England College Conference Board 1/ are 10, 5, 5, 5, and 3.75 percent, respectively, for turkey starter (first 9 weeks), broiler starter, broiler finisher, turkey breeder, and chicken breeder rations; these are the same as the 1963-1964 Board recommendations.

The recommended level of 3.75 percent fish meal in the chicken breeder rations is greater than the amount recommended by some other authorities. For example, Morrison 2/ recommends that 2.5 percent fish meal be included in chicken breeder rations together with an equal amount of meat and bone scrap. Cornell University nutritionists 3/ recommend a minimal level of animal proteins (fish meal, fish solubles, meat scraps) of 0 to 5 percent in chicken breeder rations.

The fairly liberal New England fish meal allowance is based upon evidence that fish meal in hens' rations results in increased rate of growth of chicks. The fish-meal levels recommended by the New England College Conference Board, despite their liberality, are frequently exceeded by mixed feed producers in the region. For example, one large New England firm visited by the Bureau nutritionist incorporates fish meal in broiler starter rations at a level of 7 percent.

The State of Maine, ranking about eighth largest among the broiler-producing states, represents a fairly large market for fish meal. In addition, a considerable amount of fish meal is used by the New England pork production industry. Most of the hogs raised in New England are first fed mixed rations (that often contain fish meal) and later are fed garbage until they reach slaughter weight.

The exception to the usual New England practice of liberal fish meal use is that of some producers who recently have built small feed mills in New England. Those producers have deleted fish meal together with several other ingredients from poultry rations because of lack of storage space and the high cost of feed ingredients when purchased in the small lots in which they are compelled to order them compared with the cost of those items in carload lots. Although, according to University of Maine nutritionists, experiment station authorities earlier attempted to dissuade the newly organized mixed feed producers from dropping fish meal from their formulas, the feed producers felt that they were compelled to do so by their cramped quarters and prevailing fish meal prices.

Extension workers at the University of Maine are working on a program directed toward lowering feed costs and improving the competitive position of the Maine poultry industry. A professor at the University of Massachusetts, among a number of basic investigations, is carrying out studies of endocrine influences in production. At the University of Massachusetts another professor is conducting research that reasonably may be expected to lead to some increase in the use of fish meal in swine feeding. At the University of New Hampshire, a faculty member and his co-workers are determining the niacin (B-vitamin) requirements of the hen. The control ration used in the experiments contained approximately 24 milligrams of niacin per pound of feed. Part of this niacin was provided by the 3.75 percent fish meal of the ration. (Fish meal contains 17 to 42 milligrams of niacin per pound of meal.) Niacin deficiencies lead to reductions in feed consumption and egg production of hens and reduced hatchability of eggs. Also at the University of New Hampshire, workers have determined that a daylight period of 12 hours is suffi-

cient for maximum broiler growth, a finding that may be expected to contribute to greater economy in production and, eventually, to a greater broiler industry in New England and hence to increased fish meal utilization in the region.

At all of the experiment stations visited by the nutritionist, the possibilities for productive research offered by condensed fish solubles and other industrial fish products were discussed. Because very little research has been done on fish solubles, with the exception of determinations of its unidentified growth factor (UGF) value, that product offers many research possibilities.

1/1965 Chicken and Turkey Rations. Cooperative Extension Service University of Maine (at Orono) and the U.S. Department of Agriculture cooperating.
2/Morrison, Frank B. Feeds and Feeding, 1959. The Morrison Publn. Co., Clinton, Iowa.
3/New York State College of Agriculture Extension Stencil #205 Revised Oct. 1, 1960. Ithaca, N.Y.

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U. S. FISH MEAL, OIL, AND SOLUBLES:

November 1964: United States production of fish meal in November 1964 was lower by 33.0 percent as compared with November 1963. Production of fish oil was down by 32.8 percent and production of fish solubles decreased 41.6 percent.

Major Indicators for U.S. Supply of Fish Meal, Solubles, and Oil, November 1964

Item and Period	1/1964	1963	1962	1961	1960
			(Short Tons)		
Fish Meal:					
Production:					
November	8,922	13,316	10,175	10,071	10,805
January-Nov. 2/	202,589	228,704	291,893	278,574	261,165
Year 3/	-	255,907	312,259	311,265	290,137
Imports:					
November	25,745	17,369	11,904	25,649	6,149
January-Nov.	401,320	346,592	233,330	194,577	115,997
Year	-	376,321	252,307	217,845	131,561
Fish Solubles:					
Production: 4/					
November	2,851	4,886	4,819	5,140	3,524
January-Nov. 2/	80,339	103,876	122,811	107,318	96,032
Year	-	107,402	124,649	112,254	98,929
Imports:					
November	176	171	435	3,649	282
January-Nov.	4,228	3,952	5,921	6,267	3,114
Year	-	7,112	6,308	6,739	3,174
			(1,000 Lbs.)		
Fish Oils:					
Production:					
November	6,778	10,089	8,254	10,257	12,070
January-Nov. 2/	164,863	179,433	249,385	246,927	201,406
Year	-	185,827	250,075	258,118	209,143
Exports:					
November	90	146	171	1,425	14,640
January-Nov.	140,349	229,080	122,878	112,002	127,852
Year	-	262,342	123,050	122,486	143,659

1/Preliminary.
2/Data for 1964 based on reports which accounted for the following percentage of production in 1963: Fish meal, 95 percent; solubles and homogenized fish, 99 percent; and fish oils, 99 percent.
3/Small amounts (10,000 to 25,000 pounds) of shellfish and marine animal meal and scrap not reports monthly are included in annual totals.
4/Includes homogenized fish prior to 1964--none produced in 1964.

* * * * *

Production by Areas, December 1964: Preliminary data on U. S. production of fish meal, oil, and solubles for December 1964 as collected by the U. S. Bureau of Commercial Fisheries and submitted to the International Association of Fish Meal Manufacturers are shown in the table.

U.S. Production 1/ of Fish Meal, Oil, and Solubles by Areas, December 1964 (Preliminary) with Comparisons

Area	Meal	Oil	Solubles
	Short Tons	1,000 Pounds	Short Tons
December 1964:			
East & Gulf Coasts . . .	5,092	5,428	1,722
West Coast 2/	1,503	330	1,009
Total	6,595	5,758	2,731
Jan.-Dec. 1964 Total	209,184	170,621	83,307
Jan.-Dec. 1963 Total	229,646	184,009	89,000

1/Does not include crab meal, shrimp meal, and liver oils.
2/Includes American Samoa and Puerto Rico.

* * * * *

Production, October 1964: During October 1964, a total of 5.3 million pounds of marine animal oils and 9,230 tons of fish meal was produced in the United States. Compared with October 1963 this was a decrease of 9.7 million pounds of marine animal oils and 9,039 tons of fish meal and scrap. Fish solubles production amounted to 4,824 tons--a decrease of 2,547 tons as compared with October 1963.

Menhaden oil production amounted to 3.8 million pounds--a decrease of 9.4 million pounds. Menhaden fish meal and scrap production in October 1964 amounted to 4,442 tons--a decrease of 7,756 tons as compared with the same month of 1963.

U.S. Production of Fish Meal, Oil, and Solubles, October 1964 1/ with Comparisons

Product	Oct. 1/1964	Oct. 1963	Jan.-Oct. 1/1964	Jan.-Oct. 1963	Total 1963
			(Short Tons)		
Fish Meal and Scrap:					
Herring	662	862	9,987	7,492	7,537
Menhaden 2/	4,442	12,198	141,647	166,725	184,205
Tuna and mackerel	2,720	4,011	22,611	20,069	26,957
Unclassified	1,406	1,198	19,584	21,102	22,415
Total	9,230	18,269	193,829	215,388	241,114
Shellfish, marine-animal meal and scrap	3/	3/	3/	3/	14,793
Grand total meal and scrap	3/	3/	3/	3/	255,907
Fish solubles:					
Menhaden	2,636	4,787	60,777	69,284	74,831
Other	2,188	2,584	16,711	22,482	25,347
Total	4,824	7,371	77,488	91,766	100,178
Homogenized condensed fish	-	-	-	7,224	7,224
			(1,000 Pounds)		
Oil, body:					
Herring	249	263	9,986	5,136	5,709
Menhaden 2/	3,819	13,198	137,443	153,098	167,635
Tuna and mackerel	851	951	4,912	4,773	5,903
Other (including whale)	349	567	5,744	6,337	6,580
Total oil	5,268	14,979	158,085	169,344	185,827

1/Preliminary data.
2/Includes a small quantity of thread herring.
3/Not available on a monthly basis.

* * * * *

U. S. FISH MEAL AND SOLUBLES:

Production and Imports, January-October 1964: Based on domestic production and imports, the United States available

supply of fish meal for January-October 1964 amounted to 569,404 short tons--18,103 tons (or 3.3 percent) more than during January-October 1963. Domestic production was 21,559 tons (or 10.0 percent) less, but imports were 39,662 tons (or 11.8 percent) higher than in January-October 1963. Peru continued to lead other countries with shipments of 300,820 tons.

The United States supply of fish solubles during January-October 1964 amounted to 81,540 tons--a decrease of 20.4 percent as compared with the same period in 1963. Domestic production dropped 21.7 percent but imports of fish solubles increased 17.7 percent.

U. S. Supply of Fish Meal and Solubles, January-October 1964 with Comparisons

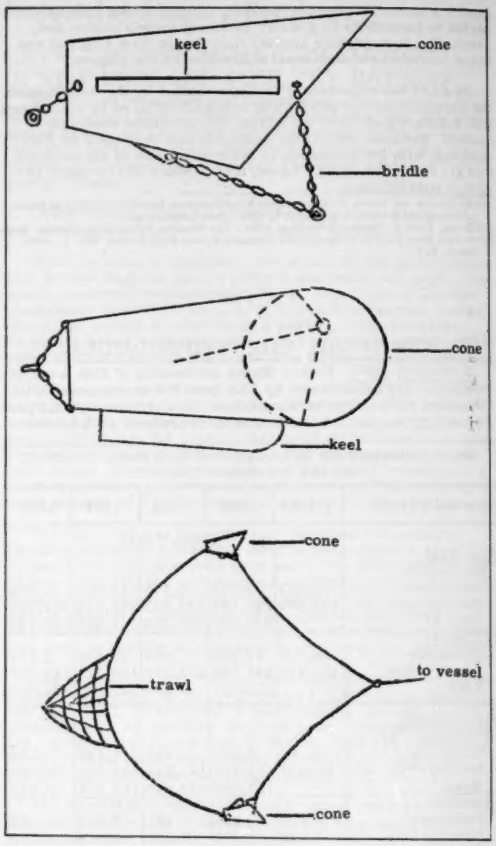
Item	Jan.-Oct. 1964 1/	Jan.-Oct. 1963	Total 1963
	. . . (Short Tons). . .		
Fish Meal and Scrap:			
Domestic production:			
Menhaden	141,647	166,725	184,205
Tuna and mackerel	22,611	20,069	26,957
Herring	9,987	7,492	7,537
Other	19,584	21,102	22,415
Total production	193,829	215,388	241,114
Imports:			
Canada	46,754	43,735	50,925
Peru	300,820	257,087	291,544
Chile	11,302	23,197	24,249
Norway	-	1,819	1,819
So. Africa Republic	13,487	8,275	12,296
Other countries	3,212	1,800	2,274
Total imports	375,575	335,913	383,107
Available fish meal supply	569,404	551,301	624,221
Fish Solubles:			
Domestic production 2/	77,488	3/98,990	3/107,402
Imports:			
Canada	1,315	1,753	2,034
Iceland	-	55	160
So. Africa Republic	935	191	411
Other countries	1,802	1,443	4,168
Total imports.	4,052	3,442	6,773
Available fish solubles supply	81,540	102,432	114,175

1/Preliminary.
2/50-percent solids.
3/Includes production of homogenized condensed fish.

Inventions

TRAWLING CONE THAT CAN SUBSTITUTE FOR OTTER BOARDS INVENTED IN DENMARK:

A device to hold open a floating trawl has been invented in Denmark where two-vessel trawling is practiced. The new invention will hold open a floating trawl when towed by only one vessel, according to the inventor. The new invention is an open-ended, cone-shaped device which supplants the usual otter boards on each side of the trawl.



The forward end of the cone is cut at a backward angle while the rear end is square. The cone has a keel underneath with a rounded front edge to prevent the cone from digging into the bottom when the trawl is fished near the bottom. A vertical bridle attaches the rear end of the cone to a cable leading to the trawl. Front bridles are attached to the forward end of the cones and then to cables which lead to a single cable to the towing vessel. The depth of the trawl is adjusted by letting out or hauling in the single cable.

In operation, the water passing through the cones keeps them separated and the trawl open. The stream of water directed back through the cones toward the trawl is expected to increase the catch when passing through a school of fish. Patent and model protection have been sought in Denmark for the device.

The inventor of the device is Hartman Fynbo, Holstvej 8, Skagen, Denmark. Since he is a tinsmith, his first models have been constructed of metal. However, his patent application states the cones may be made of collapsible material such as canvas or plastic cloth. There have been no reports of the device being used commercially. The inventor has said that a special trawl should be used with the cones, and that such a trawl is being constructed.

The Danish patent application for the device is number 3221 and was made July 6, 1963. Protection for the model of the device was sought June 21, 1963, and given registration number 39,490 by Direktoratet for Patent-og Varemaerkevaesenet, Nyropsgade 45, Copenhagen V, Denmark. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, December 22, 1964.)

New Jersey

FISHERIES, 1963:

Summary: Landings of commercial fish and shellfish in New Jersey during 1963 were 255.2 million pounds with a value of $10.2 million ex-vessel--a decrease of 191.7 million pounds (43 percent) and $1.6 million (13 percent) from 1962. Menhaden was down 196.7 million pounds, and scup or porgy was down 2.1 million pounds. Appreciable increases occurred for surf clams, which were up 7.7 million pounds, and bluefin tuna up 2.8 million pounds.

Menhaden made up 70 percent, surf clams 15 percent, scup 5 percent, and 4 species combined (fluke, whiting, bluefin tuna, and sea bass) 5 percent of the 1963 New Jersey catch.

Following are some of the highlights of the New Jersey fisheries during 1963:

New Jersey Fishery Landings, 1962-1963

Species	1963		1962	
	Quantity	Value	Quantity	Value
Fish:	Pounds	Dollars	Pounds	Dollars
Bluefish	822,219	97,132	1,091,600	118,871
Butterfish	1,385,964	125,349	2,112,700	161,452
Cod	1,238,987	161,464	1,483,900	174,750
Fluke	4,444,861	1,046,138	4,749,200	973,107
Menhaden	178,816,346	2,184,960	375,526,600	3,901,547
Scup or porgy	12,730,355	1,066,987	14,878,900	994,411
Sea bass	2,811,754	333,619	2,621,400	341,943
Striped bass	743,251	104,767	493,800	91,304
Swordfish	192,796	89,510	26,200	15,838
Tuna, bluefin	2,827,635	155,462	5,400	747
Whiting	3,408,407	142,860	3,912,500	156,781
Other fish	2,595,058	275,488	3,180,400	234,437
Total fish	212,017,633	5,694,226	410,082,600	7,165,188
Shellfish, etc:				
Crabs:				
Blue:				
Hard	828,500	99,503	1,505,000	139,692
Soft	33,150	6,630	155,500	31,088
Rock	22,767	712	22,000	892
Horseshoe	201,200	1,007	340,000	1,938
Lobsters	750,303	336,753	870,900	368,645
Clams:				
Hard	1,555,420	642,878	1,339,700	536,335
Soft	15,252	6,355	17,400	7,210
Surf	37,548,411	2,580,151	29,830,200	1,917,518
Conchs	524,053	112,242	166,200	22,680
Oysters 1/	485,365	518,183	1,553,400	1,422,234
Scallops:				
Bay	273,886	112,170	364,700	129,438
Sea	173,412	83,110	97,300	37,124
Shrimp	2/	2/	7,300	7,300
Squid	795,703	41,674	544,100	32,450
Terrapin, Diamond-back	2/	2/	3,200	1,120
Turtles	2/	2/	29,700	3,508
Total Shellfish, etc.	43,207,422	4,541,368	36,846,600	4,659,172
Grand Total	255,225,055	10,235,594	446,929,200	11,824,360

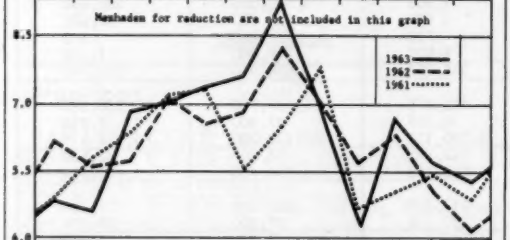
1/Does not include production taken from waters of Delaware.
2/Not available.
Note: Data for 1962 are revised. Univalve and bivalve mollusks are reported in pounds of meats. All other species are shown in round weight.

Tuna: For the first time in New Jersey's history tuna was landed in commercial quantities at the ports of Jersey City and Cape May. The tuna landings were made in 1963 by purse seiners from Massachusetts and California.

Striped Bass: Setting a record in 1963, striped bass landings totaled 743,000 pounds. Otter-trawl gear was credited with most of the catch during November and December, the period of peak production. New Jersey fishermen first took significant quantities of striped bass in otter trawls during 1961. Since that time striped bass catches by otter-trawl gear have increased each year.

Sea Bass: The catch of sea bass by pot operators in 1963 increased over 1962. The best catches occurred during the months of May and June. The catch in those 2 months accounted for more than 50 percent of the total production for the season which ended in the fall. The price for "pot" sea bass held up well during the peak months because the fish were of unusually good quality and size. Otter-trawl operators were also pleased with their catch of sea bass during the months of February, March, and December.

Swordfish: Seven vessels from New Jersey entered the long-line fishery for swordfish in 1963. Their first swordfish catches were landed during April 1963 at Hampton, Va., because that port was close to the fishing grounds. Starting in May 1963, the vessels landed all their swordfish at New Jersey ports. The majority of those vessels stopped long-lining in July and returned to otter-trawl fishing due to the drop in swordfish prices.



New Jersey landings by months, 1961-63.

Surf Clams: The record surf-clam catch in 1963 exceeded the 1962 catch by almost 8 million pounds of surf clam meats. The best catch for a 1-month period was the 4 million pounds taken in October 1963. Six vessels were added to the surf clam fleet in 1963. Early in the year surf-clam grounds previously unexploited were located off the Jersey coast. The acceptance of clam products by consumers has led to a steady increase in the surf-clam catch during the last 10 years.

Conch: Landings of conch are becoming more prominent. Various canners and bait establishments have reported an increased demand for conch meat. Inshore-boat operators have turned to the conch fishery during periods when other species have been scarce.

Squid: The New Jersey squid catch is taken mainly by offshore draggers during early spring and late fall along with more valuable catches of other species. No vessel specifically fishes for squid, yet the 1963 squid landings in New Jersey were the largest in 14 years. There is no explanation that can be given for the increase, except fishermen caught more squid while fishing for fluke.

Hard Clams: Production of hard clams in New Jersey during 1963 was up 21,683 bushels from the previous year. In general, there was a good demand for hard clams all year. (C. F. S. No. 3484, New Jersey Landings, 1963, U. S. Bureau of Commercial Fisheries.)

New York

FROZEN FOOD REGULATIONS POSTPONED:

Proposed regulations by the State of New York on the manufacture, storage, and distribution of frozen foods have been postponed by that State's Commissioner of Agriculture and Markets. The reason for the postponement, after public hearings were held, was that the Commissioner was not satisfied that the regulations should be put into effect at this time. Further investigation and conferences among State officials and affected industries are planned.

North American Fisheries Conference

FUTURE OF FISHERIES TO BE DISCUSSED AT FIRST CONFERENCE:

"The Future of North American Fisheries Resources" will be the subject of the first general session of the North American Fisheries Conference, to be held in Washington, D. C., April 30-May 5, 1965, at the Mayflower Hotel.

Robert J. Gruber, president of the National Fisheries Institute (NFI)--the host association--will preside at the Monday morning (May 3) meeting of the Conference. It will mark the first time in history that Canadian, Mexican, and United States fishery associations have ever held a joint convention. E. A. Ruthford, who is first vice-president of NFI, is chairman of the panel of speakers. Included among the speakers are Dr. W. M. Chapman, president of the Van Camp Foundation, San Diego, whose subject is "North American Fishery Potential"; Dr. John L. Kask, director of the Inter-American Tropical Tuna Commission, La Jolla, Calif., who will ask "whether or not the North American resource is being properly managed and developed"; and Dr. Peter A. Larkin, director of the Biological Station, Fisheries Research Board of Canada, Nanaimo, B. C., who will provide the answers.

All speakers are internationally known and have had the broad education and experience which make them experts in their fields. Dr. Chapman, who has been director of the School of Fisheries, University of Washington, Seattle, and first special assistant to the Under Secretary of State for Fish and Wildlife, is a member of many advisory committees and is chairman of the Panel on Law of the Sea, Committee on Oceanography, National Academy of Sciences.

Dr. Kask is the former chairman of the Fisheries Research Board of Canada and before that was assistant director of the U. S. Fish and Wildlife Service. He has also been a member of the International Commission for the Northwest Atlantic Fisheries, the International Halibut Commission, and assistant director of the International Sockeye Salmon Commission.

Dr. Larkin is a former professor of the Department of Zoology and director of the Institute of Fisheries, University of British Columbia.

Delegates to the North American Fisheries Conference will be members of the Fisheries Council of Canada; the Camara Nacional de la Industria Pesquera, Mexico; and the National Fisheries Institute of the United States. The joint meeting will commemorate the 20th anniversaries of the Canadian and United States trade associations and the 14th anniversary of the Camara. Heading the delegations will be Donovan F. Miller, president of the Canadian organization, Elias Selem Curi, president of the Camara, and R. J. Gruber of NFI.

Technology Sessions planned by the National Fisheries Institute Quality Committee and the Smoked and Cured Fish Committee will be held on the opening day of the convention. Experts in five fields will participate at the Technology Session. Special speakers at the Smoked and Cured Fish Session will include the chief of the Bacteriological Branch, Division of Microbiology, U. S. Food and Drug Administration. The sessions will be open to all Conference participants.

Note: See Commercial Fisheries Review, December 1964 p. 70.

North Atlantic

FOREIGN FISHING ACTIVITIES OFF COAST, JANUARY 1965:

In order to observe foreign fishing activities in the North Atlantic, the staff of the Fisheries Resource Management Office, U. S. Bureau of Commercial Fisheries, Gloucester, Mass., has been conducting weekly reconnaissance flights cooperatively with the U. S. Coast Guard.

Foreign fishing vessel activity during January 1965 increased slightly over the previous month. A total of 26 Soviet vessels were sighted during the month and identified as 17 fish-factory stern trawlers, 4 refrigerated fish transports, 2 fuel and water carriers, 1 tug, and 2 side trawlers. During the previous months in December 1964 there were 20 vessels and in January a year earlier there were 19 vessels of similar types operating in the area covered.

Fishing operations of the vessels observed were generally confined south and southeast of the Nantucket Lightship along the Continental Shelf between Veatch and Hydrographer Canyons. But several of the transport

ships and support vessels were seen south and east of Nantucket Island.

It was noted that very large quantities of fish overflowed the open deck storage areas of each vessel. Trawls were bulging with fish catches estimated at 30,000 to 40,000 pounds. Visual examination and photographs confirmed that both whiting and red hake (also called mud hake) were being caught, with red hake appearing to be the predominant species.

The vessels' dehydration plants in full operation seemed to indicate that fish in excess of their processing facilities were being reduced to fish meal. How much red hake is being used for that purpose is not known.

The large quantities of fish seen in January were more than has been observed since the Soviet's intensive herring operation on Georges Bank in September 1964. By the end of the month about 6 Soviet vessels were reported operating along the mid-Atlantic coast areas.

North Atlantic Fisheries Investigations

FALL DISTRIBUTION AND ABUNDANCE OF GROUNDFISH SPECIES STUDIED: M/V "Albatross IV" Cruise 64-13 (October 22-November 25, 1964): To determine the fall distribution and relative abundance of groundfish species from the Bay of Fundy southward to Hudson Canyon was the purpose of this survey by the U. S. Bureau of Commercial Fisheries research vessel Albatross IV.

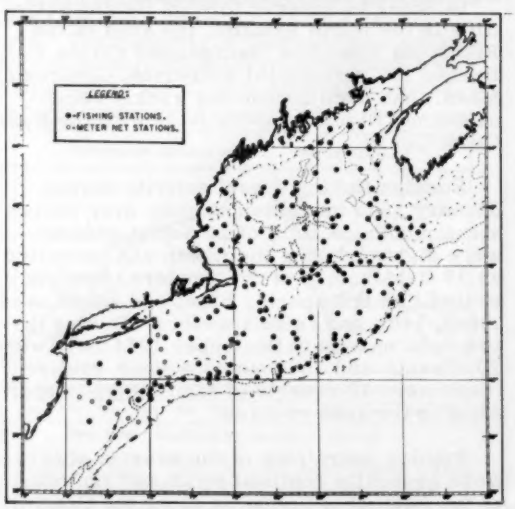


Fig. 1 - Shows fishing stations worked during Albatross IV Cruise 64-13 (October 22-November 25, 1964).

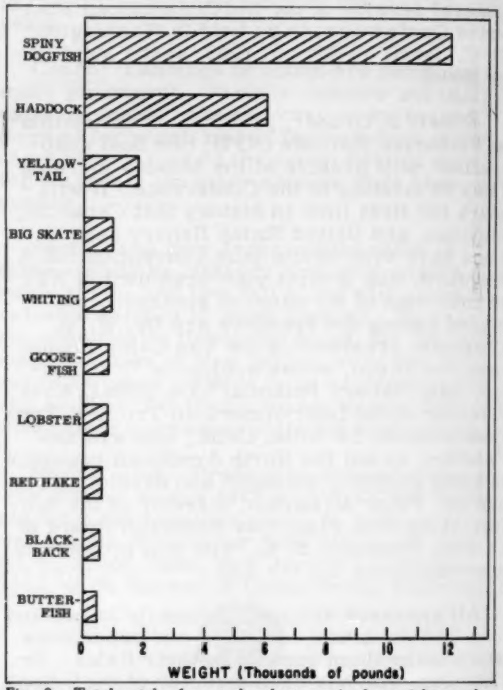


Fig. 2 - Total catch of most abundant species by weight caught during Albatross IV Cruise 64-13 (October 22-November 25, 1964).

A total of 185 groundfish stations was occupied on this cruise. All fish were identified and measured and the total weight by species was obtained from each tow. Stomach contents from a variety of groundfish species caught throughout the area were examined and recorded. Scale samples were taken from haddock and yellowtail flounders; otoliths were extracted from whiting (silver hake), squirrel hake, and white hake; blood samples were collected from selected groundfish species. Invertebrates taken in each tow were preserved. A sample of the bottom type was collected at each station. Selected groundfish species were preserved for special reference collections at the University of Maryland and Auburn University. Bathythermograph (BT) casts were made at all stations and every 10 miles between stations.

In the southern New England area, three plankton transects were made to obtain fluke eggs for the fluke program; conducted by marine biologists of the State of New Jersey.

Haddock 23 to 36 centimeters (13 to 14.2 inches) long (the 1963-year class) were caught in good quantities on Georges Bank and in the South Channel off Nantucket from depths of 30 to 50 fathoms. But the catches of the 1964-year class of haddock were low. A forecast of the influence of the 1964 year-class on future commercial landings was to be made after all the data were analyzed. Generally, catches of whiting (silver hake) were low as compared with previous years. Several good catches of ocean perch (redfish) were made in the deep waters of the Gulf of Maine. Spiny dogfish were taken in general throughout the survey area. In one tow off southern New England, over 6,000 pounds of spiny dogfish were caught in the net.

The total weight of all species caught on this survey amounted to 54,000 pounds. Spiny dogfish and haddock were at the top of the 10 most abundant species (by weight) caught during the survey.

Note: See Commercial Fisheries Review, November 1964 p. 44.

Oceanography

CONFERENCE AND EXHIBIT TO BE HELD IN WASHINGTON, D. C.:

The National Conference/Exposition on Ocean Science and Ocean Engineering will be held on June 14-17, 1965, in Washington, D.C. The meeting is cosponsored by the American Society of Limnology and Oceanography and the Marine Technology Society.

The Conference will be the first national meeting on the relation of ocean science and engineering. It will explore the role of marine technology and science in man's coming need to use intelligently the resources of the sea.

The Conference will hear a discussion of marine mineral resources. There will also be symposiums on the "Results of International Indian Ocean Expeditions"; "Navy Requirements in Oceanography"; and "Perspectives in Ocean Engineering."

A wide field of technical subjects will be discussed during the 3-day Conference. Some of the subjects are underwater research vehicles, oceanographic data-gathering techniques, instrumentation calibration and standardization, desalination, and fish farming. Other topics to be examined include water pollution control, nuclear power and the ocean, and undersea transport and storage.

A highlight of the Conference will be an exhibit of oceanographic equipment, services, vessels, and accessories. It will be the first time many of the products have been on public display, and the exhibit will be the largest oceanographic exposition ever presented.

* * * * *

"SOUND PICTURES" OF FISH SCHOOLS MAY BE POSSIBLE WITH IMPROVED ECHO-SOUNDER:

Work is under way to develop an echo-sounder accurate enough to tell an albacore from a skipjack tuna. The project is under the direction of the La Jolla (Calif.) Tuna Resources Laboratory of the U. S. Bureau of Commercial Fisheries.

A 60-foot vessel on loan from the Navy is being outfitted with special echo-sounding equipment developed by a California firm. The vessel is expected to begin testing the equipment in the spring of 1965. It will operate in the coastal waters of California.

The special sonar equipment developed for the test will employ continuous frequency-modulated sound transmission in contrast with the conventional-type sonar which sends out periodic sound waves and then stops until the echoes return from a object. A complex sound analyzer is being built to sort out the continuous sound returns and classify them. The sound returns will be displayed continuously on a cathode ray tube. The new equipment is designed to enable fishermen to tell a school of yellowfin tuna from a school of bonito, or a school of anchovy from a mass of mackerel.

For practical use, it will be necessary to extend the range of the new echo-sounder far enough to give it an advantage over visual spotting from the masthead of a vessel. The new sonar could be especially valuable for night fishing. Visual spotting is possible only on dark nights when a school of tuna, anchovy, or other fish can be seen from the

white froth or phosphorescence created by the beat of their tails in the sea.

* * * * *

NEW METHOD OF EXTRACTING RADIOACTIVE SILICON FROM SEA WATER:

A new technique for measuring naturally occurring radioactive silicon in the oceans' water should help oceanographers who are trying to chart the circulatory and mixing patterns of the seas' depths, an assistant research professor of oceanography at the University of Rhode Island announced November 21, 1964. He reported that he had successfully developed and tested a method whereby he is able to remove some 2 ounces of silicon from more than 40 tons of sea water taken from various selected depths.

Fig. 1 - Shows water sampling bag hauled aboard research vessel Trident.

About 10 out of every billion. billion atoms in this sample is radioactive Silicon-32, an isotope of the element which is formed by cosmic rays bombarding the upper atmosphere. (Isotopes are chemically similar forms of the same element which vary in weight.) Since the rate at which Silicon-32 decays is known within broad limits, the scientist's measurements give an indication of the "age" and the movements of the ocean waters. Expansion of such knowledge is vital to scientists who are concerned about the dispersal of radioactive wastes in the oceans, the scientist explained. In addition, the U. S. Navy, which is supporting his work through the Office of Naval Research, is interested in his findings.

While Carbon-14 is admittedly the best radioactive tracer for sea water, its rate of decay or half-life, he believes, is too long (half a given quantity decays in 5,700 years) in terms of the process being studied. Although it never has been accurately measured, Silicon-32 has a half-life somewhere near 300 years. This is more in line with the estimates that it takes a particle of sea water about a thousand years to complete its cycle into the depths and back again.

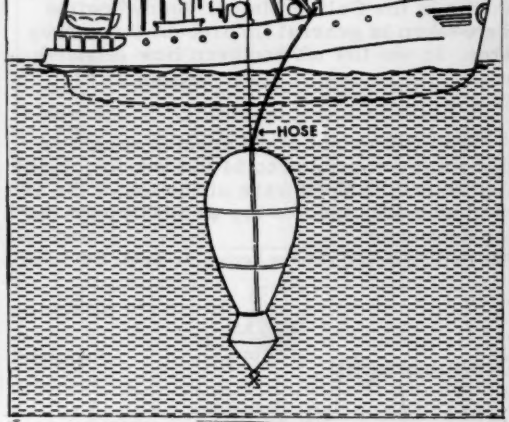


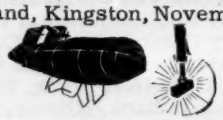
Fig. 2 - Artist's drawing shows how water sampling bag is operated.

The key item used by the scientist in his process is what is considered to be the world's largest bag water sampler, capable of collecting 10,000 gallons of water at one time. The rubberized-nylon bag is lowered empty into the water using a large shipboard winch and A-frame. At a pre-set depth a hydrostatic device opens the nine-foot mouth of the bag. As it starts to come up, water gushes through a 15-foot neck or funnel into the bag itself which is nearly 28-feet long.

When filled, the bag turns over to disengage the funnel and is hoisted to within 50 feet of the ocean's surface. Here a suction hose and pump run the collected water through an extraction system where the silicon--in the form of dissolved silica--is captured or scavenged out, using a specially treated ion-exchange resin. Silica is a common constituent of beach sand.

After treatment aboard the vessel with hydrochloric acid and distilled water, the resin yields some 150 gallons of solution which is stored aboard the University of Rhode Island research vessel Trident until returned to the University's laboratory facilities at Narragansett Bay. The radioactivity of the minute quantities of material eventually obtained is measured in a Geiger counter. (Actually Silicon-32 decays to form Phosphorous-32, a radioactive "daughter" which can be handled easily chemically and counted.)

Originally, Silicon-32 is formed on the borders of space when high-energy cosmic rays--nature's own atom smashers--strike the nucleus of Argon, creating atomic fragments some of which are Silicon-32. Argon is an inactive gas which forms a little less than one per cent of the earth's atmosphere. The atmosphere's Silicon-32 is washed to the sea's surface by rainfall and then begins the mixing process. (Press release, University of Rhode Island, Kingston, November 22, 1964.)



Salmon

RETURNS TO LOWER COLUMBIA RIVER HATCHERIES IN 1964 REPORTED EXCELLENT:

Returns of fall chinook and silver salmon in 1964 to U. S. Bureau of Sport Fisheries and Wildlife and State operated hatcheries located on the lower Columbia River and its tributaries were considered the best in years. The fall chinook egg-take at the Spring Creek National Fish Hatchery in Washington alone totaled more than 45 million. Other hatcheries operated by the state and Federal governments reported excellent takes of chinook and silver salmon eggs and holding ponds crowded with additional, unstripped silvers. Many adult fish were released above hatchery facilities or carried to other streams for natural spawning.

* * * * *

SALMON SANDWICH BIG HIT AT NEW YORK WORLD'S FAIR:

A salmon sandwich was the most popular of 16 sandwiches sold at the World's Fair booth of a soft drink firm, according to the Association of Pacific Fisheries.

Sea Lamprey

GREAT LAKES FISHERY COMMISSION COMMENDED FOR RESULTS OF ERADICATION PROGRAM:

The Great Lakes Fishery Commission was commended on January 4, 1965, by Secretary of the Interior Stewart L. Udall for the progress made by Canada and the United States toward controlling the predations of sea lampreys on commercial and sport fish species in the Great Lakes.

Secretary Udall noted that the Commission (made up of three members from each country) has reported that sea lampreys in Lake Superior have been reduced 80 percent following treatment of tributary streams by selective chemicals which kill the young lamprey. Progress has been so encouraging that the Commission now has recommended that its research agencies study the desirability of permitting a limited commercial lake trout fishery in Lake Superior in the near future. Secretary Udall also endorsed the Commission's action in directing its scientists to continue seeking more effective, but less expensive chemicals which will kill only the young lampreys and then dissipate rapidly in the water without contributing to water pollution.

Fig. 1 - Lake trout in a bed of ice with a sea lamprey wound.

Efforts to control the sea lamprey by selective chemicals have centered around Lake Superior since Canada and the United States began the joint chemical control program in 1958. At that time some lake trout remained in Lake Superior, but commercial catches in Lakes Huron and Michigan were only a fraction of 1 percent of what they were during 1930-39 when about 5 million pounds were taken from each of the two lakes. Lamprey control treatments were extended recently to Lake Michigan, where the initial series will be completed by summer 1966.

Secretary Udall said, "The apparent success of the program in Lake Superior is most

encouraging. I congratulate the Commission members on their dedication to programs to restore the Great Lakes to their rightful place as a source of revenue to commercial fishermen and a haven for sportsmen of both countries."

Fig. 2 - Feeder mechanism that maintains critical level of selective toxicants in Great Lakes streams infested with sea lampreys. The chemicals introduced in the streams selectively kill the young lamprey.

The sea lamprey reached Lake Erie from Lake Ontario when the Welland Canal--a convenient route around Niagara Falls--was deepened between 1913 and 1918. Before then, the lamprey was believed to have been in Lake Ontario for thousands of years, but unable to enter Lake Erie because of the falls and unfavorable passage conditions before the canal was deepened.

The significance of sea lamprey in Lake Erie was not realized for some time, probably because their population was small and there was no noticeable effect on fishing. But when they reached Lake Huron, where conditions were more favorable, they increased rapidly and the threat to deep-water fish became apparent. Lake trout, rainbow trout, whitefish, suckers, and many other species were caught with round wounds, about three quarters of an inch across, made by the numerous sharp teeth of the lamprey which attaches itself on its victim and feeds on its blood. Lake trout bore the brunt of the lamprey attacks and catches of trout went down first in Huron, then in Michigan, and finally in Lake Superior as the parasite multiplied in each of those lakes.

Before the invasion of the sea lamprey, lake trout were the mainstay of a flourishing and stable fishing industry with landings ranging from 14 to 17 million pounds a year in the upper Great Lakes. Fluctuation of populations made commercial fishing for other species profitable in some years, but lake trout was the backbone of the industry. When lake trout nearly disappeared, both sports fishermen and commercial fishermen lost a resource which had been receiving greater attention each year. In times past, thousands of outdoorsmen had spent millions of dollars annually on fishing and related hobbies in the lakes.

A realization that a united approach to the fisheries problem was desirable and necessary led to the establishment of the Great Lakes Fishery Commission by Canada and the United States in 1956. Since then, the Great Lakes States (New York, Pennsylvania, Ohio, Michigan, Indiana, Illinois, Wisconsin and Minnesota), the Province of Ontario, and the Governments of the United States and Canada combined efforts to control sea lampreys. The first step was a study of the life history of the sea lamprey in the Great Lakes, its spawning habits, migrations and growth, to discover at what stage in its development it could be most easily controlled. Sea lamprey migrate up streams in the spring and early summer and spawn in holes they make in a bottom of coarse gravel or sand. After spawning, the adults die. The eggs hatch in about 12 days, but several years pass before they leave a nonparasitic stage of life burrowed in sand and silt to migrate to the lakes and attack fish.

During the 12 to 20 months that adult sea lamprey spend in the lakes before re-entering the streams to spawn, they grow from about 7 inches to 17 inches. Laboratory observations have shown that a single lamprey may destroy 30 to 40 pounds of fish during the parasitic stage.

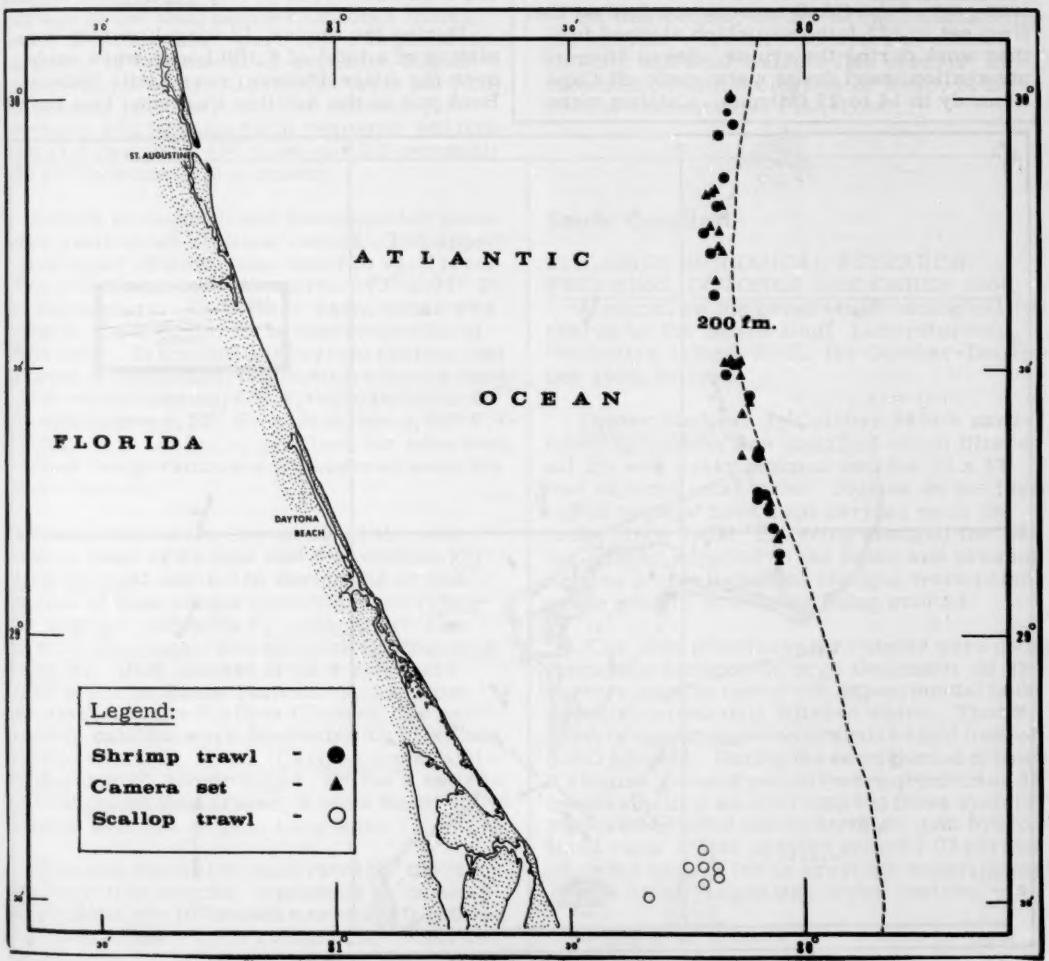
Note: See Commercial Fisheries Review, February 1964 p. 62.

South Atlantic Fisheries Exploration and Gear Research

USE OF CAMERA STUDIED TO FISH FOR ROYAL-RED SHRIMP AND CALICO SCALLOP:

M/V "Oregon" Cruise 95 (November 10-20, 1964): To obtain photographic observations of the fishing efficiency of 40-foot shrimp trawls working at 200-fathom depths and to obtain additional information on gear performance were the main objectives of this cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon. The area of operations was on the royal-red shrimp (Hymenopenaeus robustus) grounds off the Florida east coast extending from St. Augustine southward to below Daytona Beach.

A total of 43 trawl hauls was completed in depths of 177 to 225 fathoms, and a 40-foot flat trawl rigged with 6-foot chain doors was used for all drags. Slight modifications were required to position the motion picture camera over the headrope. Twenty-three drags were made without the camera gear to locate shrimp concentrations and check out bottom conditions; 20 drags were completed with the motion picture camera mounted on the headrope. A total of 3,200 feet of 16-millimeter motion picture film was exposed in the underwater



Shows the station pattern of M/V Oregon Cruise 95 (November 10-20, 1964)

camera--2,400 feet of black and white, and 800 feet of color film.

Catches with and without the camera attached to the trawl yielded royal-red shrimp of mixed sizes of from 1 pound to 75 pounds an hour. There was no indication that the camera equipment impaired the fishing efficiency of the trawls.

A secondary objective of the cruise was to continue bottom reconnaissance studies using a CA-8 35 millimeter still camera in cooperation with the National Geographic Society, and to sample a segment of the calico scallop (Pecten gibbus) bed off Cape Kennedy. The lens port of the CA-8 camera cracked on the first set in 177 fathoms, which stopped further work during the cruise. Seven 30-minute scallop trawl drags were made off Cape Kennedy in 14 to 27 fathoms. Catches were small, with the largest catch yielding about 250 scallops ranging in size from 50 to 55 millimeters (2.0 to 2.2 inches).

Note: See Commercial Fisheries Review, May 1964 p. 32.

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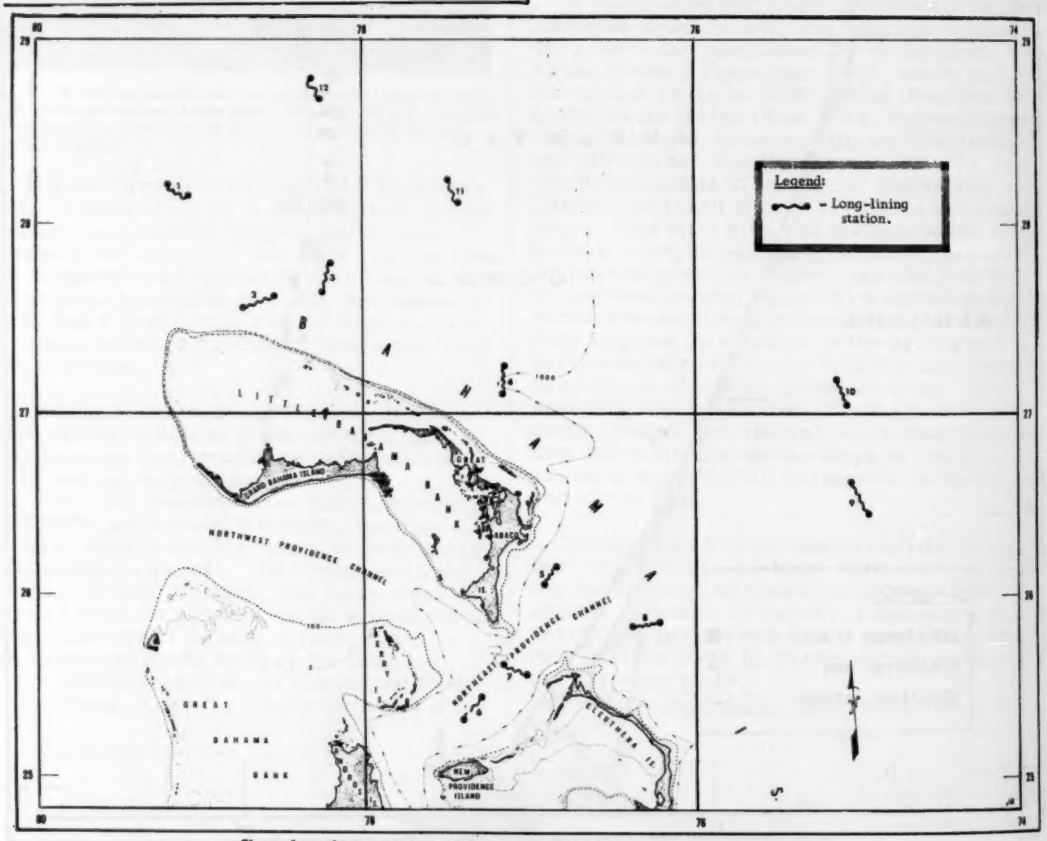
SEASONAL AVAILABILITY OF SWORDFISH AND TUNA INVESTIGATED:

M/V "Oregon" Cruise 96 (December 2-19, 1964): To conduct preliminary investigations on the seasonal availability of swordfish and tuna in the vicinity of Little Bahama Bank was the main objective of this 18-day cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon.

During the cruise, 12 long-line sets consisting of a total of 6,100 hooks were made over the Blake Plateau, near Little Bahama Bank and in the Antilles Current. One basket



Shows long-lining stations of Oregon Cruise 96 (December 2-19, 1964).

of gear consisted of a 138-fathom mainline with 10 gangions of two 4-fathom sections. Buoy-line lengths varied from 2 to 275 fathoms long. Squid and scad (Decapterus) were used for bait. The gear was usually set early in the evening and retrieved at mid-morning the next day.

Techniques were evolved for experimental deep-drop long-line fishing during the cruise. The gear was successfully fished with buoy-line lengths varying from 100 to 275 fathoms. But severe gangion twisting problems were encountered when hauling back baskets with drops greater than 100 fathoms. Buoy-line lengths and fishing effort, expressed as a percentage of the total number of hooks fished, were: 2 fathoms (4.9 percent); 5 fathoms (13.1 percent); 10 fathoms (14.8 percent); 20 fathoms (14.8 percent); 30 fathoms (14.8 percent); 50 fathoms (11.5 percent); 60 fathoms (2.4 percent); 100 fathoms (12.3 percent); 140 fathoms (4.8 percent); 190 fathoms (3.3 percent); and 275 fathoms (3.3 percent).

Bathythermograph and thermometer casts were made at all stations visited. The upper mixed layer of water was found to vary from 30 to 70 fathoms in depth and from 72° to 77° F. in temperature. Extremely warm water was found to great depth, as is characteristic of that region. In the Antilles current system east of Great Abaco Island, temperature depths were: 70° F.--105 fathoms; 65° F.--190 fathoms; 60° F.--255 fathoms; 55° F.--300 fathoms; 50° F.--335 fathoms. A similar gradient, but with even warmer temperatures was observed over the Blake Plateau.

Catch rates were low on all of the sets made; a total of 20 tuna and 6 swordfish (Xiphias gladius) was taken during the cruise. Species of tuna caught were big-eyed (Thunnus obesus), yellowfin (T. albacares), albacore (T. alagunga), and skipjack (Katsuwonus pelamis). Best catches from 4 sets were made over the Blake Plateau. Aside from one station in the Antilles Current, the remaining catches were dominated by silky and oceanic white-tip shark (Carcharhinus falciformis) and C. longimanus). Of the 6 swordfish caught on this cruise, 3 were taken on baskets with 100-fathom buoy lines.

Tuna and swordfish catch rates for the various buoy-line lengths, expressed as number of fish taken per 100 hooks, were: 2 fathoms--0.07; 5 fathoms--0.73; 10 fathoms--0.44; 20 fathoms--0.33; 30 fathoms--0.33; 50 fathoms--0.13; 60 fathoms--0.00; 100 fathoms--0.80; 140 fathoms--0.33; 190 fathoms--0.00; and 275 fathoms--0.00. Although the number of fish caught and amount of fishing time during the cruise was low, indications were that highest catch rates were made on baskets with 100, 5- and 2-fathom buoy lines, respectively. The 100-fathom baskets also yielded the greatest poundage of fish per unit of effort: 85 pounds per 100 hooks as compared to 42 pounds per 100 hooks for the 140 fathom baskets, and 40 pounds per 100 hooks for the 5-fathom baskets. Catch rates for the remaining baskets were less than 25 pounds per 100 hooks.

On this cruise, 20 dip-net and nekton ring-net stations were also occupied to collect juvenile and adult pelagic fish species, in cooperation with biologists of the U. S. Bureau of Commercial Fisheries.

South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, OCTOBER-DECEMBER 1964:

A report on the progress of biological research by the Bears Bluff Laboratories, Wadmalaw Island, S. C., for October-December 1964, follows:

Oyster Studies: In October 1964 a sand-filtering system was installed which filtered all the salt water pumped into the 12 x 12 foot experimental tanks. Studies on the feeding of oysters have been carried on in the tanks since 1963. Filtering changed the water quality supplied to the tanks and presumably as a result of this, changes were noted in the growth of oysters being studied.

Five sets of underwater weights were made from mid-October through December on 32 oysters kept in one of the experimental tanks which received only filtered water. Those oysters experienced an overall weight loss of 0.993 percent. During the same period of time a similar group of weights were obtained on 33 oysters held in another tank but those oysters received filtered water fortified with hydrolized rice. These oysters gained 1.03 percent. Thus fed oysters (as in previous experiments) gained more weight than unfed oysters.

A group of oysters comparable in size were held in trays under the dock in We Creek

(the main source of salt water for ponds and tanks at Bears Bluff). Four sets of underwater weights were available for those oysters. They showed that the oysters in that environment gained 1.06 percent in total weight. Thus oysters in unfiltered water gained considerably more than those held in filtered water and in fact gained a fraction of a percent more than oysters held in filtered water fortified with carbohydrate food.

Studies have commenced to retest the results.

Shrimp Studies: Experimental otter trawling and plankton sampling throughout coastal waters continued on schedule during October-December 1964. Earlier in the year, experimental plankton tows indicated a scarcity of postlarval white shrimp in inshore waters, and it was predicted that the 1964 commercial catch of white shrimp would be below normal. Generally the predictions have proven correct, and although the commercial catch for white shrimp was greater in 1964 than in 1963, the harvest was far from normal.

Postlarval white shrimp continued to enter coastal waters until mid-October, but did not reach any great peak of abundance during the recruitment period. A moderate increase in the numbers of those postlarvae as well as postlarvae of the spotted shrimp was, however, noted in mid-September through early October. This was rather unusual for that time of year. Those postlarvae entered too late to be of significance commercially. By December they had reached a length of only $2\frac{1}{2}$-$4\frac{1}{2}$ inches, but experimental trawling indicated that those small shrimp were fairly plentiful in inshore waters during December.

According to experimental tows, white shrimp were slightly more plentiful in coastal waters during October-December of 1964 as compared with that period of 1963. Brown shrimp, usually not abundant during that time of year, were caught in greater numbers that quarter than in that of 1963, and unusual numbers of juvenile brown shrimp were noted in most rivers and sounds during November.

Although it is too far in advance for predictions as to the commercial shrimp catch for 1965, the abundance of juvenile shrimp during November and December is somewhat encouraging. If the winter is mild and the small shrimp now present in coastal waters survive until spring to spawn, the commercial crop of shrimp for 1965 should be better.

Data obtained from experimental otter trawling during the quarter indicated that croaker were slightly less plentiful in 1964 than during the same period in 1963. Spot also declined somewhat in abundance as compared with the last quarter of 1963.

Pond Cultivation: Several experiments in pond cultivation were concluded during October and November. Two one-acre ponds, two one-quarter-acre ponds, and several smaller ponds were drained and harvested. Best results were had in the smaller experiments, chiefly because supplies of postlarval and juvenile shrimp for pond stocking were scarce in nearby waters and inadequate numbers were obtained for large-scale projects. Heavy rainfall (30 inches in July) resulted in below normal growth and above normal mortality in the experimental shrimp.

In one experiment in a $\frac{1}{10}$-acre pond, 868 small (3-4 inch) shrimp were stocked between June and September. That pond was treated with rotenone in July and traps were used to remove crabs. The shrimp in that pond were fed a total of 138 pounds of chopped crab and fish during the growing period, an equivalent of over 1,300 pounds per acre. Over 27 pounds of shrimp were harvested from that small pond when it was drained on October 16, 1964, the equivalent of almost 300 pounds per acre.

In another experiment using a 12 x 12 foot concrete tank, the bottom of which was covered with pond mud, 2.5 pounds of shrimp were harvested on October 12 when the tank was drained. This is the equivalent of about 800 pounds per acre. The tank had been stocked with postlarval shrimp beginning in March and continuing through August. Shrimp in the tank were fed an equivalent of over 3,000 pounds per acre of chopped trash fish and crabs.

The one-acre "Oyster Pond" was stocked with about 850 juvenile brown shrimp during May-August and only 43 pounds 4 ounces of shrimp were harvested when the pond was drained on October 14. Mortality in that pond was high and the shrimp were much smaller than normal for that time of year. The shrimp in that pond had been fed several hundred pounds of chopped fish and crabs. Low sa-

linity due to excessive rainfall apparently greatly impeded their growth.

The other one-acre pond at Bears Bluff also yielded a low harvest of shrimp when it was drained on October 19, 1964. This pond had been allowed to stock naturally by the tidal flow of water into it from the nearby creek during March and April and again in July and August. Only about 23 pounds of shrimp were harvested, reflecting the scarcity of shrimp in nearby waters. Those shrimp also were much smaller in size than usual, again chiefly because of low salinities during the culture period.

The two one-quarter acre ponds, which were harvested on November 5 and 6, had been stocked in March 1964 with fish chiefly juvenile winter trout, channel bass, spot, croaker, and flounder. Forage shrimp and fish were also stocked in those ponds, and food in the form of chopped crabs and fish was introduced at regular intervals during the experiment. Survival and growth rates were good in both ponds. Over 60 percent of the fish stocked were harvested and many had increased in length by as much as six inches. Those experiments indicate the feasibility of using salt-water ponds for food and game fish.

Fish Kill: One small fish-kill occurred in the Ashley River beginning on November 18. Fresh water catfish, striped bass, croaker, spot, and menhaden were found dead and dying. Dead fish were observed over a three-day period along the river from Magnolia Gardens to the Municipal Yacht Basin. A survey crew from Bears Bluff collected water samples and dead fish on November 19. Those samples were turned over to the South Carolina Water Pollution Control Authority, for determination as to the cause of the kill.

Texas

FISHERIES, 1963:

Summary: Landings of fish and shellfish at Texas ports during 1963 totaled 166.3 million pounds valued at $30.1 million ex-vessel sel--a decrease of 3 percent in quantity and less that 1 percent in value from 1962. The leading species landed in Texas during 1963 were menhaden 83.7 pounds, shrimp (heads-on) 70.2 million pounds, blue crab 3.0 million pounds, oysters 2.6 million pounds, and red snapper 2.2 million pounds. Those 5 species accounted for 97 percent of Texas fishery landings in 1963.

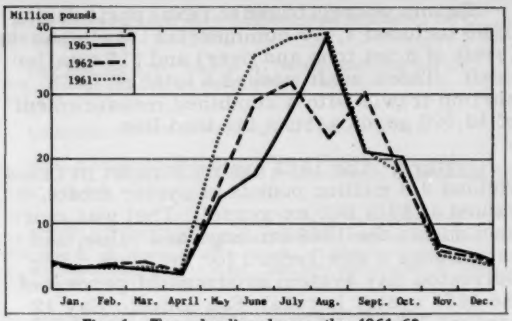


Fig. 1 - Texas landings by months, 1961-63.

Shrimp: Domestic landings of headless shrimp at Texas ports in 1963 were 44.1 million pounds (70.2 million pounds, heads-on) with an ex-vessel value of $26.6 million. That was well above the 35.2 million pounds of heads-off shrimp landed in 1962, but below the $27.1 million received for the 1962 catch. Texas ports accounted for 34 percent of the quantity and 42 percent of the ex-vessel value of all domestic shrimp landings in the Gulf States during 1963.

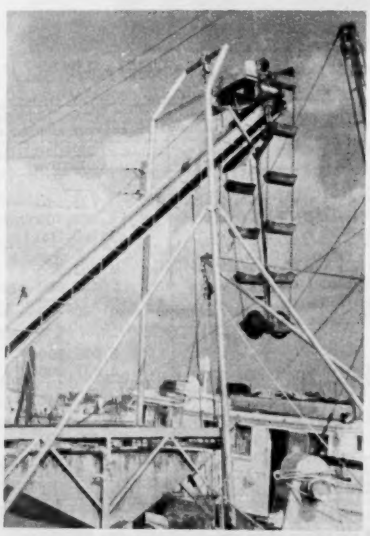


Fig. 2 - Shrimp conveyor unloader at Aransas Pass, Tex.

Shrimp vessels based at Texas ports during 1963 included 1,419 commercial trawl vessels (craft of 5 net tons and over) and 919 smaller craft. Those craft worked a total of 3,475 shrimp trawls with a combined measurement of 48,000 yards across the lead line.

Oysters: The 1963 oyster harvest in Texas yielded 2.6 million pounds of oyster meats valued at $914,000 ex-vessel. That was more than double the 1962 landings and value, and established a new record for the State. The Galveston Bay system produced 81 percent of the 1963 oyster harvest, San Antonio Bay 12 percent, Lavaca Bay 4 percent, and 5 other bays accounted for the remainder. A total of 241 oyster-dredge craft and several tong crews shared in the record commercial oyster harvest. In addition, sport fishermen took substantial quantities of oysters for home use. In 1963, most of the oyster meats were very good in quality. The yield of oyster meats per Texas bushel (92-96 pounds) of shell stock was down slightly from 1962 in both the spring and fall harvest because catches were not culled as carefully as in previous years.

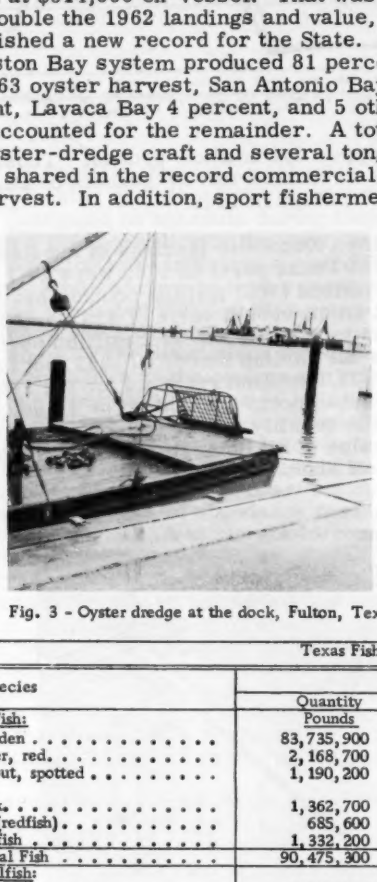


Fig. 3 - Oyster dredge at the dock, Fulton, Tex.

Blue Crab: Texas landings of blue crab in 1963 were 3 million pounds with an ex-vessel value of $200,000, a decline from the 4.5 million pounds valued at $290,000 landed during 1962. Four crab-processing plants operated in Texas during 1963 and were supplied by 70 craft fishing a total of 9,668 crab pots.

Edible Finfish: Landings of edible finfish in Texas during 1963 amounted to 6.6 million pounds valued at $1.3 million ex-vessel. Red snapper landings of 2.2 million pounds valued at $590,000 accounted for 33 percent of the quantity and 45 percent of the ex-vessel value of the 1963 edible finfish landings in Texas. The red snapper landings were at the highest level since 1908 when 2.3 million pounds were landed. The red snapper catch contained many small fish in 1963. The catch of red snapper taken on many fishing trips consisted mostly of fish weighing less than 3 pounds. A total of 119 full- and part-time craft worked in the 1963 red snapper fishery. Four new vessels joined the snapper fleet in 1963.

Landings of almost all other edible finfish species of major commercial importance remained at the 1962 level. Spotted sea trout

Texas Fisheries Landings, 1962-1963

Species	1963		1962	
	Quantity	Value	Quantity	Value
Fish:	Pounds	Dollars	Pounds	Dollars
Menhaden	83,735,900	1,034,170	103,874,000	1,137,394
Snapper, red	2,168,700	590,440	1,742,300	444,308
Sea trout, spotted	1,190,200	301,601	989,100	248,583
Drum:				
Black	1,362,700	106,935	1,373,200	105,125
Red (redfish)	685,600	165,878	699,400	171,063
Other fish	1,332,200	158,702	1,570,800	146,905
Total Fish	90,475,300	2,357,726	110,248,800	2,253,378
Shellfish:				
Crabs, blue	2,982,200	199,968	4,478,400	290,032
Oysters	2,617,900	913,835	1,210,900	473,117
Shrimp (Heads-on): 1/				
Brown and Pink	55,811,100	21,752,846	44,250,700	22,156,446
White	13,719,500	4,805,748	10,813,600	4,893,721
Other	700,800	32,899	1,078,300	98,823
Squid	37,400	3,884	27,700	2,770
Total Shellfish	75,868,900	27,709,180	61,859,600	27,914,909
Grand Total	166,344,200	30,066,906	172,108,400	30,168,287

1/Does not include bait shrimp sold to sport fishermen. Over 1 million pounds of bait shrimp valued at $1.3 million was produced in the Galveston Bay area. Bay systems from Matagorda to Port Isabel also yielded substantial quantities of bait shrimp.

Note: Oysters are reported in pounds of meats (8.75 pounds per gallon). All other species are shown in round weight. The weight of heads-on shrimp was determined by multiplying heads-off weight by the following factors: brown, 1.61; pink 1.60; white 1.54; royal red, 1.80; and sea bobs, 1.53.

landings increased slightly, while the catch of redfish and black drum was practically unchanged.

General: About 40 new vessels (craft of 5 net tons and over) entered the Texas shrimp fishery in 1963, while about 10 vessels were lost at sea.

Two new types of winches were developed in the Aransas Pass area in 1963. One is a complete hydraulic system using three independent drums. It is practically free of wearing parts, easy to operate, and has good safety features. The second type winch is a modified gear-driven rig capable of holding enough cable to work waters in excess of 300 fathoms and was designed primarily for use by vessels fishing for royal-red shrimp.

Suction hoses for unloading industrial fish are being tried at Texas ports. The apparatus shows considerable promise, but the elaborate pick-up hose (some 10 inches in diameter) is heavy and somewhat difficult to handle.

There were no major changes in Texas port facilities in 1963. However, improvements for the Port Lavaca-Palacios area (comparatively minor ports prior to 1962) were made in 1963. New channels and a jetty system breaching the width of Matagorda Bay and extending just over 1 mile into the Gulf were partially completed. The expected completion date of the entire project will be late 1965. When completed, the project is expected to increase the landings of shrimp at Palacios and Port Lavaca as both ports are adjacent to the Pass Cavallo fishing grounds, one of the most productive areas in the northern Gulf of Mexico. (C. F. S. No. 3627, Texas Landings, 1963, U. S. Bureau of Commercial Fisheries.)

U. S. Fishing Vessels

FISHERIES LOAN FUND AND OTHER FINANCIAL AID FOR VESSELS, OCTOBER 1-DECEMBER 31, 1964:

From the beginning of the program in 1956 through December 31, 1964, a total of 1,582 applications for $41,665,972 were received by the U.S. Bureau of Commercial Fisheries, the agency administering the Federal Fisheries Loan Fund. Of the total, 828 applications ($18,656,590) had been approved, 520 ($12,566,272) had been declined or found ineligible, 195 ($7,701,992) had been withdrawn by the applicants before being processed, and 39 ($725,270) were pending. Of the applications approved, 309 were approved for amounts less than applied for--the total reduction was $2,015,848.

The following loans were approved from October 1, 1964, through December 31, 1964:

New England Area: George W. Durfee, Boothbay Harbor, Me., $6,000; and Estrela Corporation, Gloucester, Mass., $91,370.

California: Alfred P. Faraldo, Fort Bragg, $8,283.

South Atlantic and Gulf Area: Jesse W. Callaway, Gulf Shores, Ala., $7,666; and Edward F. Winchester, Brownsville, Tex., $16,000.

Pacific Northwest Area: Peter S. Berg, Freeland, Wash., $6,000; Peder L. Bredal & Leon Pedersen, Seattle, Wash., $30,000; H. W. Myers, Seattle, Wash., $7,359; North Pacific Enterprises, Inc., Seattle Wash., $80,000; and Kristen H. Vedo, Seattle, Wash., $32,115.

Alaska: Karl E. C. Bradlee, Cordova, $3,200; Maurice D. Ingman, Ketchikan, $4,000; Sherman A. Vincent, Ketchikan, $12,000; Arthur C. Nelson, Kodiak, $48,000; Alfred Torsen, Ouzinkie, $15,000; Richard I. Eliason, Sitka, $5,000; and Thomas W. Maloney, Auke Bay, $3,500.

Under the Fishing Vessel Mortgage Insurance Program (also administered by the Bureau) during the fourth quarter of 1964, 3 applications for $131,662 were received. Since the program began (July 5, 1960), 64 applications were received for $6,269,913. Of the total, 52 applications were approved for $3,368,741 and 8 applications for $2,272,654 were pending as of December 31, 1964. Since the mortgage program began, applications received and approved by area are:

New England Area: Received 12 ($1,314,500), approved 8 ($775,365).

California: Received 2 ($1,262,000), approved 1 ($557,000).

South Atlantic and Gulf Area: Received 39 ($1,777,389), approved 35 ($1,455,305).

Pacific Northwest Area: Received 8 ($1,861,250), approved 5 ($526,296).

Alaska: Received 3 ($54,774), approved 3 ($54,774).

U.S. Foreign Trade

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January 1-December 31, 1964, amounted to 52,930,989 pounds (about 2,520,523 standard cases), according to preliminary data compiled by the U. S. Bureau of Customs. That was 3,482,649 pounds (about 165,841 standard cases) less than the 56,413,638 pounds (about 2,686,364 standard cases) imported during January 1-December 31, 1963.

Imports of canned tuna in brine in 1964 were substantially below the quota for the year. The quantity of tuna canned in brine which could have been imported into the United States during the calendar year 1964 at the 12½ percent rate of duty was 60,911,870 pounds (or about 2,900,565 standard cases of 48 7-oz. cans). Any imports in excess of that quota would have been dutiable at 25 percent ad valorem.

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AIRBORNE IMPORTS OF FISHERY PRODUCTS, JANUARY-OCTOBER 1964:

Airborne fishery imports into the United States in October 1964 consisted mainly of shrimp from Venezuela and Panama. Shipments were about the same as in the previous month.

Airborne shrimp imports in October 1964 totaled 735,300 pounds, the bulk of which was fresh and frozen raw headless shrimp. About 98 percent of the airborne shrimp imports in October 1964 entered through the Customs District of Florida. The remainder entered through the Customs Districts of New York (N.Y.), Galveston (Tex.), New Orleans (La.), Los Angeles (Calif.), and Puerto Rico.

Spiny lobsters from British Honduras and Jamaica were the main shellfish item other than shrimp imported by air in October 1964.

Total airborne fishery imports in January-October 1964 were down 7.8 percent in quantity and 6.4 percent in value from those in the same period of 1963. The decline was due to smaller shipments of shrimp and spiny lobsters from Central and South American countries.

U. S. 1/Airborne Imports of Fishery Products, January-October 1964 with Comparative Data

Product and Origin 2/	1964				1963	
	October		Jan.-Oct.		Jan.-Oct.	
	Qty. 3/	Value 4/	Qty. 3/	Value 4/	Qty. 3/	Value 4/
	1,000 Lbs.	US$ 1,000	1,000 Lbs.	US$ 1,000	1,000 Lbs.	US$ 1,000
Fish:						
Mexico	6.8	0.7	320.5	64.7	245.2	66.4
Canada	-	-	14.8	4.8	-	-
Other countries	2.9	2.4	30.8	37.7	100.9	114.4
Total fish	9.7	3.1	366.1	107.2	346.1	180.8
Shrimp:						
Guatemala	-	-	-	-	141.6	74.0
El Salvador	-	-	159.1	96.8	258.0	172.7
Honduras	-	-	10.3	3.8	99.8	52.3
Nicaragua	8.2	4.7	87.8	50.3	477.2	159.1
Costa Rica	14.1	5.6	310.2	166.8	582.5	278.9
Panama	137.3	87.3	950.1	586.4	1,442.5	776.2
Venezuela	574.7	302.5	5,245.9	2,504.9	4,161.9	1,956.1
Ecuador	-	-	-	-	111.6	39.4
France	-	-	-	-	2.6	0.9
British Guiana	-	-	10.5	5.2	-	-
Mexico	-	-	2.1	1.4	13.2	6.9
Other countries	1.0	1.7	13.1	6.9	-	-
Total shrimp	735.3	401.8	6,789.1	3,422.5	7,290.9	3,516.5
Shellfish other than shrimp:						
Canada	-	-	312.9	173.4	213.3	109.2
Mexico	-	-	14.4	9.9	97.6	57.6
British Honduras	46.4	38.4	253.7	203.9	309.9	253.7
Honduras	7.4	3.9	80.3	82.6	17.0	7.0
Nicaragua	-	-	50.5	40.0	164.5	100.0
Costa Rica	0.5	0.5	19.1	14.7	73.8	60.1
Jamaica	10.4	13.6	63.3	63.2	65.7	49.5
Other countries	4.0	1.4	58.5	25.8	102.7	90.9
Total	68.7	57.8	852.7	613.5	1,044.5	728.0
Grand total	813.7	462.7	8,007.9	4,143.2	8,681.5	4,425.3

1/Imports into Puerto Rico from foreign countries are considered to be United States imports and are included. But United States trade with Puerto Rico and with United States possessions and trade between United States possessions are not included.
2/When the country of origin is not known, the country of shipment is shown.
3/Gross weight of shipments, including the weight of containers, wrappings, crates, and moisture content.
4/F.o.b. point of shipment. Does not include U.S. import duties, air freight, or insurance.
Note: These data are included in the overall import figures for total imports, i.e., these imports are not to be added to other import data published.
Source: United States Airborne General Imports of Merchandise, FT 380, October 1964, U.S. Bureau of the Census.

The data as issued do not show the state of all products--fresh, frozen, or canned--but it is believed that the bulk of the airborne imports consists of fresh and frozen products.

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PROCESSED EDIBLE FISHERY PRODUCTS, NOVEMBER 1964:

United States imports of processed edible fishery products in November 1964 were down 10 percent in quantity and 1 percent in value from those in the previous month due mainly to lower imports of frozen groundfish fillets and blocks from Canada. The decline was partly offset by higher imports of sea catfish fillets, halibut fillets, canned albacore tuna, canned sardines in oil, and canned crab meat.

Compared with the same month in 1963, imports in November 1964 were down 4 percent in quantity, but up 12 percent in value.

In November 1964, imports were down for cod fillets, ocean perch fillets, canned tuna other than albacore, and canned oysters. But imports in November 1964 were up for flounder fillets, swordfish fillets, sea catfish fillets, yellow pike fillets, canned albacore tuna, canned sardines in oil and not in oil, and canned crab meat.

In January-November 1964, imports were up 1 percent in quantity and 6 percent in value from those in January-November 1963. During January-November 1964, there were larger imports of groundfish blocks (increase mainly from Canada and Iceland), flounder fillets, yellow pike fillets, and sea catfish fillets. Imports were also up for canned albacore tuna and canned sardines not in oil. But there was a decline in imports of most other canned fish import items (tuna other than albacore, crab meat, oysters, salmon, and sardines in oil).

U.S. Imports and Exports of Processed Edible Fishery Products, November 1964 with Comparisons

Item	Quantity				Value			
	Nov.		Jan.-Nov.		Nov.		Jan.-Nov.	
	1964	1963	1964	1963	1964	1963	1964	1963
	. . (Millions of Lbs.) . .				. . (Millions of $) . .			
Fish & Shellfish:								
Imports 1/	49.8	51.8	497.7	493.4	16.6	14.8	151.8	143.7
Exports 2/	6.7	3.7	45.0	30.2	3.3	1.8	23.6	14.5

1/Includes only those fishery products classified by the U.S. Bureau of Census as "Manufactured foodstuffs." Included are canned, smoked, and salted fishery products. The only fresh and frozen fishery products included are those involving substantial processing, i.e., fish blocks and slabs, fish fillets, and crab meat. Does not include fresh and frozen shrimp, lobsters, scallops, oysters, and whole fish (or fish processed only by removal of heads, viscera, or fins, but not otherwise processed).
2/Excludes fresh and frozen.

Exports of processed edible fish and shellfish from the United States in November 1964 were up 46 percent in quantity and 6 percent in value from the previous month due mainly to heavy shipments of canned salmon and canned squid. In November 1964, shipments of canned salmon totaled 3.6 million pounds (about half of which went to the United Kingdom); shipments of canned squid totaled 1.1 million pounds (most of which went to Greece).

Compared with the same month of 1963, the exports in November 1964 were up 81 percent in quantity and 83 percent in value. The increase was due mainly to larger shipments of canned salmon.

Processed fish and shellfish exports in the first 11 months of 1964 were up 49 percent in quantity and 63 percent in value from those in the same period of 1963. In January-November 1964 there were much larger shipments of canned mackerel and canned salmon. Exports of canned shrimp and canned sardines in oil were also higher, but exports of canned sardines not in oil and canned squid were down.

Note: See Commercial Fisheries Review, Feb. 1965 p. 44.

Vessels

CERTAIN DRY CHEMICAL FIRE EXTINGUISHERS REQUIRE PRESSURE GAUGES:

The U. S. Coast Guard has ruled that all fire extinguishers of the dry-chemical, stored-pressure type manufactured after June 1, 1965, must be equipped with pressure gauges if the extinguishers are to be carried on board motorboats or other vessels as required equipment.

That ruling does not affect extinguishers now carried on board and not fitted with pressure gauges as long as the extinguishers are maintained in good and serviceable condition.

Dry-chemical extinguishers have a smothering action that is effective on burning liquids such as gasoline, oil, and grease. Dry-chemical extinguishers are also effective for fighting live electrical fires in motors, switches, and navigating and fish-finding equipment.

Vessel owners are urged to maintain their fire protection on board and have their fire extinguishers refilled and retagged at least once a year.

Virginia

MARINE SCIENCE SUMMER TRAINING PROGRAM FOR HIGH SCHOOL STUDENTS:

The National Science Foundation has granted $8,245 to the Virginia Institute of Marine Science to conduct a marine science training program in Norfolk, Va., during the summer of 1965. The program is for high school students.

The Virginia Institute has presented advanced science courses in Norfolk to outstanding students for three summers. The purpose of the program is to challenge exceptional secondary school students to higher achievement, and to make it possible for Norfolk schools to use their marine environment as an aid in developing a strong science curriculum.

Fifteen students will be admitted to the program, 10 of whom will be selected from the private and public schools of Norfolk. Five students may be selected from other schools in the continental United States. Students accepted into the program must have studied biology and completed the 10th grade.

Three science teachers will also be selected for the program so they will become familiar with marine ecology. Participating teachers will form a nucleus around which improved science courses will be built. (Virginia Institute of Marine Science, Gloucester Point, January 8, 1965.)

Washington

UNEMPLOYMENT INSURANCE COSTS IN THE FISHING INDUSTRY:

An analysis of unemployment insurance in Washington State shows that fishing industry benefits have exceeded tax income. From 1939 through 1963, benefits to the fishing industry were more than 3 times greater than tax income. To have matched unemployment insurance taxes with benefits to the fishing industry in Washington State, the tax rate in the fishing industry would have had to be about 8.5 percent of taxable wages rather than the statutory 2.7 percent.

In terms of high relative benefit costs, however, the fishing industry in Washington State was surpassed in 1964 by the heavy construction industry and by the "miscellaneous manufacturing" group. (Washington State Employment Security Department.)

* * * * *

ROCK SLIDE INTERFERES WITH SALMON MIGRATION ON COWLITZ RIVER:

On December 14, 1964, a rock slide blocked fish ladders at Mayfield Dam on the Cowlitz River in Washington State. With the fish ladders knocked out, migrating silver salmon and steelhead trout were temporarily unable to reach upstream spawning grounds. Emergency action opened two minor fishway entrances at Mayfield Dam by December 31, 1964. It was hoped that some salmon and steelhead were getting past the dam through those entrances.

Salmon and steelhead migrants arriving in the Mayfield Dam area after the slide occurred were collected below the dam and trucked around the project to continue their journey upstream.

The number of salmon and steelhead which were delayed by the slide and lost their spawning potential is not known. An additional 3,000 to 5,000 coho salmon and upwards of 10,000 steelhead are expected to reach Mayfield Dam during the first part of 1965.

Permanent correction of the fish facilities at Mayfield Dam cannot be started until water conditions permit a more thorough evaluation of the damage. The work may have to be delayed until early summer 1965.

The director of the Washington State Department of Fisheries said the situation is similar to that at Mayfield in the spring of 1962 when a slide trapped more than 1,500 steelhead between the powerhouse and the arch dam. The magnitude of the recent slide and subsequent blockage of the fishway, however, is much greater than that experienced in 1962.

The slide in December 1964 at Mayfield destroyed portions of both the upstream and downstream flume systems, which are a part of the permanent fish collection and transportation system. Rock deposited below the spillway from the slide was carried over the fish barrier dam by the high spillway flows. That dumped a large quantity of rock in the river below the barrier dam in front of the powerhouse. The rock material made the adult-collection and fish-ladder facilities completely inoperable. In addition, turbulence created in front of the adult fish entrances stopped all upstream migration of salmon and steelhead. (Washington State Department of Fisheries, January 7, 1965.)

Wholesale Prices

EDIBLE FISH AND SHELLFISH, JANUARY 1965:

Prices for fresh and frozen fishery products rose 2.4 percent from December to January. The January 1965 wholesale price index for edible fish and shellfish (fresh, frozen, canned) at 112.1 percent of the 1957-59 average was 2.1 percent higher than in the same month of 1964.

An increase in the drawn, dressed, or whole finfish subgroup index of 9.5 percent from December to January resulted from (1) a sharp increase in prices at Boston for ex-vessel large haddock (up 34 percent); (2) substantially higher

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, January 1965 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1957-59=100)			
			Jan. 1965	Dec. 1964	Jan. 1965	Dec. 1964	Nov. 1964	Jan. 1964
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					112.1	109.5	108.9	109.8
Fresh & Frozen Fishery Products:					118.3	113.8	113.0	113.0
Drawn, Dressed, or Whole Finfish:					121.8	111.2	111.7	116.5
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.17	.13	133.3	99.5	107.8	141.0
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.40	.40	118.3	118.3	112.4	96.1
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.85	.83	119.1	115.6	115.6	118.4
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.61	.51	90.3	76.1	74.6	69.4
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.75	.70	122.8	114.6	106.4	80.3
Processed, Fresh (Fish & Shellfish):					116.0	111.9	111.1	115.4
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.56	.45	134.8	109.3	106.9	142.0
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.94	.90	109.6	105.5	102.5	100.8
Oysters, shucked, standards	Norfolk	gal.	7.13	7.13	120.1	120.1	122.2	128.6
Processed, Frozen (Fish & Shellfish):					111.8	112.8	110.8	102.8
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.37	.37	92.5	92.5	88.7	98.9
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.40	.40	115.8	115.8	112.9	114.3
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.31	.30	106.9	105.2	103.4	117.5
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.95	.96	112.1	113.8	112.7	95.5
Canned Fishery Products:					101.8	102.2	102.2	104.7
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	21.00	21.25	91.5	92.6	92.6	102.4
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.56	11.56	102.6	102.6	102.6	103.3
Mackerel, jack, Calif., No.1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	6.25	6.25	105.9	105.9	105.9	97.5
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	10.00	10.00	128.3	128.3	128.3	114.9

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

prices for Great Lakes fresh-water fish--Lake Superior fresh whitefish prices at Chicago were up 18.7 percent and round fresh yellow pike prices at New York City increased 7.2 percent; and (3) a 2-percent rise in frozen dressed king salmon prices. Prices for frozen dressed western halibut were steady during January and remained unchanged from the previous month. As compared with the same month a year earlier, prices this January were higher for all products in the subgroup (except fresh ex-vessel haddock--down 5.5 percent) and the index was higher by 4.5 percent. January 1965 prices for frozen halibut were 23.1 percent higher than in January a year earlier because of low stocks in cold-storage, and prices for Great Lakes fish were sharply higher due to very light market supplies.

Higher January 1965 prices for most processed fresh fish and shellfish products were responsible for a 3.7-percent increase from the previous month in that subgroup index. Fresh small haddock fillets at Boston were much higher-priced (up 23.3 percent) this January than in December 1964, but they were 5.1 percent lower than the very high prices of January 1964. A gradually stronger market at New York City for fresh South Atlantic shrimp (wholesale price up 4 cents a pound) this January caused prices to rise 8.7 percent above January a year earlier. The January 1965 subgroup index was up only slightly from the same month in 1964 because considerably higher shrimp prices were offset by price decreases for other items in the subgroup.

From December 1964 to January 1965, prices for frozen ocean perch fillets at Boston rose slightly (up 1.6 percent) while at Chicago frozen shrimp prices declined in about the same proportion. Those opposite trends resulted in an 0.9-percent drop from the previous month in the January 1965 processed frozen fish and shellfish subgroup index. January prices for other items in the subgroup were unchanged from the preceding month. The January 1965 subgroup index at 11.8 percent of the 1957-59 average was 8.8 percent higher than in Januars 1964 principally because of considerably higher shrimp prices and a small increase in prices for frozen haddock fillets.

Slightly lower prices for canned pink salmon (down 1.2 percent) in January 1965 brought the subgroup index for canned fishery products down 0.4 percent from the previous month. Prices for all other canned fishery products in the subgroup--tuna, jack mackerel, Maine sardines--remained unchanged from November 1964 through January 1965. Canners' stocks of pink salmon (16-oz. No. 1 tall) on hand January 1, 1965, were about 1.4 million cases as compared with nearly 1.6 million cases on hand December 1, 1964. As compared with January 1964, the subgroup index this January was 2.8 percent lower--prices this January for canned salmon and tuna were lower, but those for Maine sardines and California jack mackerel were much higher than in the same month a year earlier because stocks were light.

OUR DROWNED ATLANTIC COAST SHORELINE

At one time, not too long ago, the shoreline was well out to sea, and one present offshore fishing bank, Georges Bank, was an island. These events generally have been acknowledged by scientists for some time now, but recently biologists from the U. S. Bureau of Commercial Fisheries Biological Laboratory, Woods Hole, Mass., and the Woods Hole Oceanographic Institution have added significantly to our knowledge of older shorelines. They delineated two ancient oyster reefs at depths of 19 and 30 fathoms (115 and 180 feet), extending from Cape Cod to Cape Hatteras, respectively, dating approximately 8,000 and 11,000 years ago. More recently the Oceanographic Institution biologist has announced the discovery of peat from Georges Bank, containing the remains of salt marsh grasses and spruce. This is the first solid evidence that Georges Bank was a forested island during the glacial period.

International

INTERNATIONAL PACIFIC HALIBUT COMMISSION

ANNUAL MEETING:

The annual meeting of the International Pacific Halibut Commission was held at Vancouver, B.C., starting January 19, 1965. The opening session was with fishermen, vessel owners, dealers, and other interested parties for the presentation and discussion of the findings and regulatory proposals of the Commission, and for preliminary discussion of any new regulatory suggestions.

On January 21 a joint meeting was held with the Conference Board of fishermen's and vessel owners' representatives and with dealers' representatives, and other invited persons.

The International Pacific Halibut Commission is responsible for the regulation of the halibut fishery of the Northern Pacific Ocean and Bering Sea.

The Commission is composed of the following members for the United States: Harold E. Crowther, Chairman; and Haakon M. Selvar. The third United States Commissioner, to succeed William A. Bates who died on October 29, 1964, has not yet been appointed by the President. Members for Canada are: Dr. William M. Sprules, Vice Chairman; Martin K. Eriksen; and Frank W. Millerd.

INTERNATIONAL NORTH PACIFIC SALMON FISHERIES COMMISSION

FORECAST OF 1965 SOCKEYE AND PINK SALMON RUN TO PUGET SOUND AND FRASER RIVER:

The International North Pacific Salmon Fisheries Commission held its annual meeting in Bellingham, Wash., December 11, 1964. The Commission regulates the catch of pink and sockeye salmon in certain waters of Washington State and British Columbia. The catch in those waters (known as Convention waters) is adjusted to provide adequate escapement of pink and sockeye salmon. Fishing is also regulated to divide the allowable catch equally between United States and Canadian fishermen.

The staff of the Commission has developed rough estimates--representing "not a prediction but a guess"--of the 1965 run in Convention waters as follows:

Sockeye Salmon: The 1965 sockeye run to the Fraser River may be substantially lower than that in the brood year of 1961 when there was a disappointing run of only 4,125,000 sockeye in Convention Waters. That sockeye forecast is based on the heavy mortality which occurred on the spawning grounds in the brood year of 1961. The Commission has planned regulations on the basis of a total run in 1965 of 3 million sockeye allowing for an escapement of 1 million. However, to gain an accurate insight into the size of the 1965 sockeye run the Commission will have to wait for the appearance of the Early Stuart run in late June and early July 1965. A good run will raise hopes for the balance of the Fraser run, a poor one will be disappointing.

The proposed regulations for the sockeye fishery in Convention waters will be adjusted up or down during the season, depending on the weekly catch, to provide a total escapement of about 1 million sockeye regardless of the size of the run.

Pink Salmon: The Commission is projecting a 1956 pink salmon run in Convention waters of 10 million fish compared with 16 million in 1963. That includes 6.5 million Fraser River fish--up from 4.5 million in 1963. The Puget Sound run of pink salmon in 1965 is expected to be down considerably from the spectacular run of 10.5 million fish in 1963. (Facts on Fish, Fisheries Association of B.C., December 21, 1964.)

FISH MEAL

WORLD PRODUCTION, OCTOBER 1964:

World fish meal production in October 1964 was up 40 percent from the previous month due mainly to a seasonal increase in Peruvian output.

International (Contd.):

World Fish Meal Production by Countries, January-October 1963-1964

Country	Oct.		Jan.-Oct.	
	1964	1963	1964	1963
	.....(Metric Tons).....			
Canada	4,927	12,553	44,623	64,583
Denmark	13,074	6,727	95,645	87,170
France	1,100	1,100	11,000	11,000
German Fed. Republic	6,369	5,585	63,545	63,792
Netherlands	900	900	6,700	5,600
Spain	1/	1,900	1/	18,812
Sweden	673	639	5,973	5,174
United Kingdom	5,584	5,516	63,807	63,757
United States	8,373	16,572	175,823	195,379
Angola	5,402	3,620	47,475	21,394
Iceland	13,064	930	115,309	78,267
Norway	15,815	7,822	162,630	109,907
Peru	130,492	76,764	1,189,562	903,437
So. Afr. (incl. S.-W. Afr.)	15,855	14,749	2/ 250,928	233,072
Belgium	375	375	3,750	3,750
Chile	10,743	858	124,979	75,877
Morocco	1/	-	3/ 17,150	1/
Total	232,746	156,610	2,378,899	1,940,971

1/Data not available.
2/Revised.
3/Data available only for Jan.-Sept. 1964.
Note: Japan does not report fish meal production to the International Association of Fish Meal Manufacturers at present.

World fish meal production in the first 10 months of 1964 was considerably above that in the same period of 1963. The increase was due largely to expanded production in Peru which accounted for about 50 percent of world output during January-October 1964. Higher production during January-October 1964 was also reported in Norway, South Africa, Chile, Iceland, Angola, and Denmark. The increase was partly offset by lower production in Canada and the United States.

Most of the principal countries producing fish meal submit data to the Association monthly (see table).

EUROPEAN FREE TRADE ASSOCIATION

INDUSTRIAL TARIFFS REDUCED ANOTHER 10 PERCENT:

On December 31, 1964, a further cut of 10 percent was made in the level of tariffs on industrial goods traded among the seven Member Countries of the European Free Trade Association (EFTA)--Austria, Denmark, Norway, Portugal, Sweden, Switzerland, and the United Kingdom. The 10 percent reduction also applies to imports from Finland, which is associated with EFTA. (The temporary 15 percent surcharge on imports recently imposed by the United Kingdom for balance of payments reasons is not affected by the new EFTA tariff cut.)

The latest EFTA tariff cut brings the general level of EFTA tariffs on industrial goods down to 30 percent of the level in force on January 1, 1960. Finnish tariffs on most EFTA industrial goods will be reduced to 30 percent of their basic level on March 1, 1965. Fishery and agricultural products are not included under industrial goods.

A further reduction of 10 percent in EFTA tariffs will be made at the end of 1965. The remaining 20 percent will be eliminated on December 31, 1966, for the seven EFTA Member Countries; in the case of Finland, the remaining 20 percent will be eliminated in two stages--10 percent at the end of 1966 and 10 percent at the end of 1967. (European Free Trade Association, December 31, 1964.)

Note: See Commercial Fisheries Review, March 1964 p. 35.

TERRITORIAL WATERS AND FISHING LIMITS

VIOLATIONS CHARGED BY SEVERAL EUROPEAN COUNTRIES:

Danish and West German Salmon Cutters Fined for Entering Polish Waters: Eight Danish and two West German salmon cutters were in sheltered waters off the Polish coast on November 19, 1964, when a Polish patrol vessel appeared and signaled they should proceed to Gdynia. On arriving at the Polish port, the salmon cutters were accused of fishing within 1 nautical mile of the Polish coast, according to newspaper reports. In 2 days the Danish vessels were released after paying a fine and costs amounting to 180 kroner (US$26.10). The West German vessels were reported to have paid larger fines. The Danish cutters claimed they had taken shelter in the lee of a storm with their engines stopped and their gear stowed under the deck when they were forced to head for Gdynia.

Denmark Charges Foreign Vessels with Fishing Limit Violations: Two Polish cutters were apprehended by Danish authorities on September 5, 1964, and charged with fishing within Danish fishing limits off Christiansö on the island of Bornholm. According to newspaper reports, the Polish cutters were fishing with floating trawls for herring and had a catch of 6,600 pounds when picked up. A few days later the cases were heard in court and the Polish vessel captains were fined.

In late 1964, the Danish Fisheries Ministry sent an inspection vessel to Aalbaek Bay, a fishing area near Skagen, one of Denmark's most important fishing ports, to look into the complaints of local fishermen about the activities of foreign fishing fleets, especially Soviet, Polish, and East German vessels. Dan-

International (Contd.):

ish fishermen claim that the foreign vessels anchor within Danish fishing limits where they transfer catches, discard wornout gear and other offal, and interfere with the fishing activities of about 20 Danish seiners which operate in the bay.

The Skagen Fisheries Association complained about the situation to the Soviet Government and received in reply a letter from the Soviet Embassy stating that arrangements had been made which would prevent the future discharge of offal from Soviet vessels not only in Aalbask Bay but in all Danish waters. At the same time, the letter pointed out that the Soviet Union could not be responsible for violations of vessels not under the Soviet flag.

Representatives of Polish fishermen are expected to visit Denmark to discuss fishery problems with Danish fishermen.

Danish Fishing Vessels Refused Shelter in East German Waters: In two instances in late 1964 Danish fishing vessels were barred from seeking shelter in East German territorial waters. A vessel from Stubbekøbing seeking shelter near Darsser Ort in November 1964 was boarded by an East German patrol vessel. After the papers of the Danish vessel were examined it was ordered to leave East German territorial waters.

Another Danish vessel from Stubbekøbing seeking shelter along the East German coast was also boarded by an East German patrol. The Danish skipper was taken to Warnemunde for a hearing and accused of illegal fishing. Later he was released and ordered outside the East German 3-mile limit.

East German Trawler Warned in Greenland Waters: During an inspection trip in the southern district of Greenland in October 1964, a Danish inspection vessel came upon an East German trawler anchored in Arsuk Fjord, according to a Danish newspaper. A Danish fishery officer went on board the East German vessel which turned out to be a modern stern trawler equipped to fish in North Atlantic waters and also serve as a marine research vessel. The East German vessel captain was warned that in the future he must seek permission to enter and remain in Greenland waters. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, December 2 and 22, 1964.)

EUROPE

FISHERY LANDINGS AT RECORD HIGH IN 1963:

The combined fishery landings of European nations (not including U.S.S.R.) in 1963 were at a record high of 8.84 million metric tons accounting for 19 percent of the world catch. Only Asia, with a total catch of 17.8 million tons (39 percent of the world total) caught more fish in 1963 than the nations of continental Europe, the Food and Agriculture Organization (FAO) announced December 22, 1964.

Fig. 1 - A typical 52-gross-ton Danish fishing vessel operating out of Skagen.

Other fishery catches by continent in 1963 were: South America, 8.49 million tons or 18 percent of the world total, North America (including Greenland, Central America, the Caribbean Islands, Canada, Mexico, and the United States), 4.31 million tons (9 percent); the U.S.S.R., 4.0 million tons (9 percent); Africa, 2.81 million tons (6 percent),

The largest European fishery catch was Norway's with 1,387,800 tons, a slight increase over the 1,331,700 tons caught in 1962.

Fig. 2 - Britain's first conventional distant-water freezer-trawler, Ross Fighter.

International (Contd.):

Norway ranked sixth in world fishery landings-- behind Peru, Japan, Mainland China, the U.S.S.R., and the United States. Norway's best fishing year was 1956 when 2,187,300 tons was caught.

Spain ranked second among European nations with a 1963 fishery catch of 1,097,900 tons, and was in ninth place in world fishery landings. In 1962, Spain's fishery landings were 1,075,400 tons.

In 1963 Denmark and the Faroe Islands caught 985,000 tons, an increase of 56,600 tons over the 1962 catch of 928,400 tons. They were in 11th place in the 1963 world order.

The United Kingdom fishery catch in 1963 was 951,200 tons as compared with 944,300 tons in 1962, and below the record 1948 catch of 1,206,100 tons. The United Kingdom ranked 12th in the 1963 world fishery catch.

Iceland's 1963 catch of 784,500 tons was below the 832,600 ton catch in 1962, and ranked 14th in the world.

France caught 742,300 tons in 1963, slight drop from the 744,300-ton catch in 1962. France's best fishery catch of 750,900 tons was in 1961. France ranked in 16th place in the 1963 world fishery landings.

The Federal Republic of Germany 1963 fishery catch was 646,900 tons. This was above the 1962 catch of 632,700 tons, but more than 100,000 tons below her best catch of 814,800 tons in 1955. The Federal Republic ranked 17th in the world.

Portugal was the only other European nation to catch more than one-half million tons of fish in 1963--a total of 539,800 tons compared with 525,600 tons in 1962.

Other European nations catching 100,000 tons or more were: Netherlands 361,000 tons; Sweden, 339,800; Italy, 231,600; Poland, 226,700; and East Germany, 184,800. (Food and Agriculture Organization, Rome, December 22, 1964.)

NORTH AMERICA

FISHERY LANDINGS IN 1963:

Fishery landings in North America (includes Central America, Greenland, the Caribbean Islands, Canada, Mexico, and the United States) totaled 4,310,000 metric tons in 1963 as compared with 4,490,000 tons in 1962, the Food and Agriculture Organization (FAO) announced December 22, 1964.

Fig. 1 - Purse seiners at a dock in San Pedro, Calif. (U.S.A.)

In 1963 the North American fishery catch accounted for about 9 percent of the total world catch of 46.4 million tons. It was the first time the North American catch dropped below 10 percent of the world catch; in 1948 it was 19 percent.

The United States fishery catch in 1963 was 2,711,900 tons, a drop of 260,900 tons from the 2,972,800 tons caught in 1962. The highest annual catch for the United States was in 1956 with 2,989,400 tons. Since then it has tended to average from 2.7 million to 2.9 million tons.

For several years the United States has ranked fifth in world fishery landings--behind Peru, Japan, Mainland China, and the Soviet Union.

Canada's 1963 catch was 1,191,300 tons, the highest ever recorded; in 1962 it was 1,124,800 tons.

International (Contd.):

Fig. 2 - Irish moss, a multi-use seaweed abundant on parts of the Canadian Atlantic Coast. Impurities are being removed from Irish moss drying in the sun near Miminegash, N.B., Canada.

Mexico's 1963 catch was 244,300 tons, also a record catch for that country. In 1962 it was 218,600 tons, and the previous high was in 1961 with 225,400 tons.

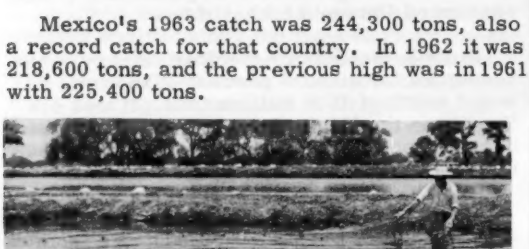


Fig. 3 - Fresh-water fish farm at Chapingo, near Mexico City, Mexico. Workers catching fish in one of the ponds by setting a net across it.

Greenland's catch was 33,300 tons, a drop of 10,000 tons from the 1962 total of 43,300 tons, and the lowest since 1958.

Cuba's 1963 catch was a record 35,600 tons, slightly above the 35,000 tons caught in 1962. Cuba's fishery catch has increased steadily over the past few years.

The 1963 fishery catch of all other North American countries was less than 20,000 tons for each country. (Food and Agriculture Organization, Rome, December 22, 1964.)

FOOD AND AGRICULTURE ORGANIZATION

HIGHLIGHTS OF 11TH SESSION OF INDO-PACIFIC FISHERIES COUNCIL:

The 11th Session of the Indo-Pacific Fisheries Council (IPFC) of the Food and Agriculture Organization (FAO) was held at Kuala Lumpur, Malaysia, October 16-31, 1964. Highlights of topics discussed follow:

Cooperative Study of the Kuroshio Current: The Council noted the proposed Cooperative Study of the Kuroshio (CSK), laid down in document UNESCO/IOC/INF-47, and the resolution (Resolution III-5) on the CSK approved at the Third Session of the Intergovernmental Oceanographic Commission (IOC). The importance of an understanding of the environment in the development of fishery resources to their maximum sustainable yield is recognized. The CSK has potential to contribute such understanding for a large area of the western Pacific Ocean.

The Council noted that the proposed fishery aspects of the CSK are stated in rather general terms, without reference to specific processes, fisheries, or areas as the objects of study. Owing to the existence of a considerable store of knowledge of the resources of the Kuroshio area and to the limitation of, for example, the amount of ship time available, it was considered that a set of specific problems should be selected for study and effort concentrated on the sea. The Council believed, however, that the specific fishery problems to be studied as part of the CSK must be defined by those fishery scientists and agencies who will actually bear the responsibility for making the studies. The Council recognized that the physical, chemical, and biological oceanographic observations will provide a general framework within which the fishery observations may be considered.

Pollution: The views and policy expressed by the Council on pollution were:

International (Contd.):

1. "Viewing with concern the continued increase in the pollution of natural waters, both fresh and coastal, through industrial development, urbanization, and modern agricultural practice.

2. "Emphasizing that the use of pesticides harmful to aquatic life, particularly by broadcasting, was rendering large areas of fish-producing waters no longer fully productive.

3. "Considering that the long term effects of the continued use of such pesticides could be potentially of considerable danger not only to the living aquatic resources but also to their food organisms and to man himself."

The Council resolved to: (a) "Emphasize to Member Governments the urgent and immediate need to review their policies in this regard.

(b) "Urge on Member Governments the desirability of exploring more fully the possibility of developing and adopting suitable (including biological) control measures not harmful to aquatic life against agricultural pests.

(c) "Request the Director-General of FAO to render all possible assistance to Member Governments in order to diminish by all practical measures the current dangers.

(d) "Request the Director-General of FAO to make available to Member Governments the documentation on pollution control in Europe and North America and urge on them the desirability of adopting the code presented in these documents and of forming suitable bodies to implement that code."

Recommendation on the Indian Ocean: The Council recognized the growing need for animal protein in the human dietary requirements of the countries surrounding the Indian Ocean and was aware of the ability of the Indian Ocean fishery resources, if rationally developed, to contribute substantially to the filling of those needs on a sustainable basis.

Further, the Council realized the need, by developing fishing industries, and the governments in those countries to be able to take into account the seasonal and cyclical variability in fish availability and abundance arising from temporal changes in the environment as well as from increased fishing pressure in planning the rational development of those fisheries, since local conditions of fish abundance and availability may be strongly affected by climatic and oceanographic conditions arising in the far distance and not detectable locally. Recognizing the necessity for a regional ocean-wide, as well as national approach to those problems into which the results of national fishery development programs can be fitted and can grow, the Council resolved to request FAO in consultation with appropriate other United Nations bodies, to examine the feasibility of designing and funding a program of fishery oceanography for the Indian Ocean which would provide a regional background of knowledge and understanding of the ocean for the use of national fishery development programs, which would make use of this sort of information arising from the International Indian Ocean Expedition and national fishery development work, and which would provide a long-range program incorporating both national and regional elements under which the rational development of the Indian Ocean Fisheries could proceed expeditiously.

South China Sea and Sunda Shelf: The Governments of Thailand and Vietnam proposed to conduct a cooperative research project in the South China Sea and the Sunda Shelf with particular emphasis on research that might lead to the development of the fishery resources of that area. The Council recalled that various studies had been made of the area, notably the Naga Expedition in the Gulf of Thailand and the South China Sea, and recognized that the results of this and other expeditions would provide much guidance in planning the project proposed by the Governments of Thailand and Vietnam.

Recognizing the contribution that the proposed project could make to development of fisheries in the region, the Council resolved to recommend the project to the attention of countries bordering the Sunda Shelf, especially Malaysia and the Philippines. The Council requested FAO and UNESCO to give all possible assistance to the project, and suggested that the working party appointed in connection with the compilation of data from tropical trawling operations by Malaysia fishermen might be able to assist in planning that project and interpreting its results.

FAO's Role in Fishery Development: The Council considered Resolution 8/63 of the 12th Session of the FAO Conference which requested

International (Contd.):

the Director-General and the FAO Council to improve the status of fisheries within FAO. The IPFC Council, represented by the Member Governments of Australia, Ceylon, France, India, Japan, Korea, Malaysia, Netherlands, Pakistan, Philippines, Thailand, United Kingdom, United States, and Vietnam, recommended that the Fisheries Division of FAO be elevated to the departmental level in the 1966/67 biennium. It proposed that the Director-General might present this recommendation to the upcoming 13th Session of the FAO Conference, to be held in the fall of 1965 in Rome, Italy. The Council indicated that this action was desirable in order that "FAO may be better organized to aid Member Countries speed the rational development of their Fisheries in the Indo-Pacific area as well as elsewhere."

Note: See Commercial Fisheries Review, December 1964 p. 73.

OCEANOGRAPHY

NORDIC CULTURAL COMMISSION MEETS:

At its meeting in Helsinki on November 16-18, 1964, the Nordic Cultural Commission (Nordiska Kulturkommissionen), among other things, recommended that the Nordic countries (a) augument their national efforts in physical oceanography, and (b) develop a joint program to promote research in physical oceanography. To initiate work on promoting research in physical oceanography, the Commission requested that 100,000 Norwegian Kroner (about US$14,500) be made available for the Fiscal Year 1965/1966. It is understood that Norway will serve as the coordinating country.

The group of experts at the meeting have identified certain areas of collaboration which should have priority during the initial phase. They include: (1) a fellowship and stipened program to facilitate exchange of teachers, scientists and students; (2) arrangements for joint symposia, exchange of information, data, etc.; (3) joint expeditions on the high seas; (4) joint efforts in developing equipment (including oceanographic buoys); (5) the establishment of a Nordic Board of Physical Oceanography (Nordisk Kollegium for Fysisk Oceanografi) along the lines already existing for marine biology.

That Board is to be composed of one representative for each of the 5 countries. As progress is made to recruit talent and to develop a joint program, coordination of the efforts in physical oceanography and marine biology will be considered.

At its November meeting the Nordic Cultural Commission approved the proposals of the group of experts and since considerable prior coordination had been achieved. It was believed that the individual governments will approve the proposals made.

Impressions derived from the meeting, which were also shared by influential persons in Denmark, Finland, Norway, and Sweden, were the recommendation adopted by the Nordic Cultural Commission need not be nearly as modest as the requested appropriation might indicate. Funds for oceanographic work are available in the regular budgets of the institutions concerned, and additional funds can be obtained from different Research Councils and other money-granting national organizations. The short-term gain of the program may be considerable and will come from a reorientation of the national programs, a stimulation of influx of new talent to oceanography, and better recognition of the importance of oceanography by the governments and parliaments concerned. Such recognition may be further stimulated if it were made known that a joint and expanded effort in oceanography by the Nordic countries would be a valuable component of a general scheme for the North Atlantic and Arctic region. (United States Embassy, Stockholm, December 16, 1964.)

WHALING

ANTARCTIC SEASON FOR 1964/65 OPENED DECEMBER 12, 1964:

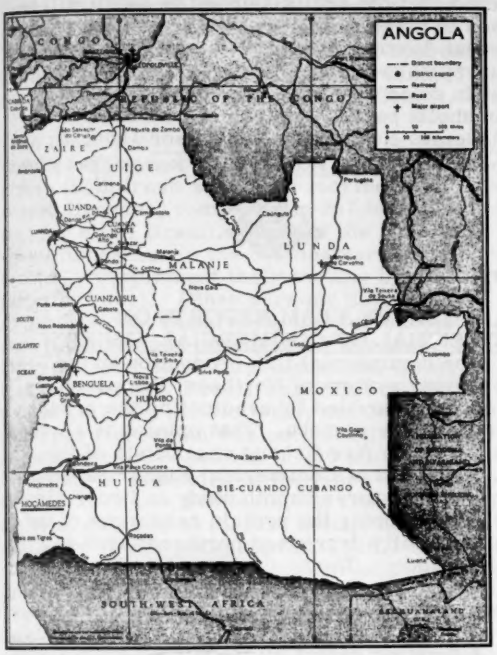
The 1964/65 Antarctic whaling season opened on December 12, 1964, with a total of 15 expeditions from the U.S.S.R., Japan, and Norway participating. Norway has 4 factoryships and 36 catchers; Japan, 7 factoryships and an estimated 76 catchers; the U.S.S.R., 4 factoryships and an estimated 68 catchers. (United States Embassy, Oslo, December 22, 1964.)

Angola

NEW FISH-PROCESSING INDUSTRY PLANNED FOR SOUTHERN REGION:

The Angolan press reported in November 1964 that the Sociedade Portuguesa de Pesarias Restole (SARL) has requested authorization from the provincial government of An-

Angola (Contd.):



gola to install a new fish-processing industry in Mocamedes. Construction is to be in two phases--first, a refrigeration plant with a capacity of 2,500 tons, and second, a factory for making fish meal and for salting, drying, and canning fish. (United States Consulate, Luanda, December 3, 1964.)

Australia

FISHERY EXPORT TRENDS, JULY-SEPTEMBER 1964:

A sharp jump in scallop and shrimp exports was the main feature of Australian fishery exports in July-September 1964. Exports of spiny lobster tails were down due to bad weather in Western Australia, the main producing State. However, spiny lobster tail shipments were expected to improve when the main fishing season began. The total value of Australian exports of fishery products in July-September 1964 was up 14 percent from that in the same period of 1963, according to preliminary data.

Australian scallop exports continued their rapid expansion and reached a record level of A£55,000 ($122,100) in September 1964. Export values in September 1964 for the other leading Australian fishery products were: shrimp A£202,000 ($448,440); spiny lobster tails A£124,000 ($275,280); and whole spiny lobster A£18,000 ($39,960).

Value of Australian Exports of Leading Fishery Items, July-September 1963-1964

Product	July-September			
	1964		1963	
	A£1,000	US$1,000	A£1,000	US$1,000
Spiny lobster:				
Tails	392	870	681	1,512
Whole	147	326	124	275
Total spiny lobster	539	1,196	805	1,787
Shrimp	466	1,035	217	482
Scallops	142	315	-	-
Total of products shown	1,147	2,546	1,022	2,269

Note: Australian £1.00 equals US$2.22.

Australian shrimp exports are steadily increasing as new grounds are developed off Queensland and Western Australia. Japan remains Australia's best customer for shrimp, accounting for 82 percent of the value of Australian shrimp exports in July-September 1964.

The United States remains the main market for spiny lobster tails and France takes most of the whole spiny lobsters.

Abalone is another shellfish resource which Australia is interested in developing. Australian exports of frozen abalone in fiscal year 1963/64 (ending June 1964) totaled 180,000 pounds and were valued at more than A£50,000 ($111,000). Most of the frozen abalone went to Japan. (Australian Fisheries Newsletter, December 1964.)

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SPINY LOBSTERS BRING RECORD PRICES:

In Australia during November 1964, the first 1964/65 season spiny lobster shipment from Tasmania sold for record prices on the Sydney Fish Market. The price for fresh boiled spiny lobsters was 7.5 shillings (83 U.S. cents) a pound.

Prices in Melbourne, Australia, also were strong with live spiny lobster flown from Tasmania selling for up to 6.75 shillings (75

Australia (Contd.):

U.S. cents) a pound, and fresh boiled spiny lobster for 7.5 shillings (83 U.S. cents) a pound.

The relatively high prices in Australia were said to reflect the high prices for spiny lobster tails in the United States. (Australian, Fisheries Newsletter, December 1964.)

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NEW IMPORT DUTIES ON CANNED TUNA, CANNED SALMON, AND CANNED FISH CUTLETS:

Import duties on a wide range of canned fishery products were recommended by the Australian Tariff Board in a report presented in the Australian House of Representatives during October 1964. The Australian Government has adopted the main recommendations of the Tariff Board. Canned tuna, canned fish cutlets (barracouta, mackerel, etc.), and canned salmon are the most important items affected by the new tariffs. Following are the new Australian import duties levied on those items:

Canned tuna: 0.25d. (0.23 U.S. cents) a pound for canned tuna from countries which are accorded "most favored nation" trading treatment. Such countries include Japan and Peru, the two main suppliers of canned tuna to Australia.

Canned fish cutlets: 9d. (8.3 U.S. cents) a pound.

Canned salmon: The new import duty on canned salmon applies only to imports with an f.o.b. value of less than 4.5s. (50 U.S. cents) a pound. When applicable, the duty on canned salmon is 1d (0.925 U.S. cents) for each 1.5d (1.388 U.S. cents) that the f.o.b. price falls below 4.5s. (50 U.S. cents) a pound.

The new import duties were imposed to give protection to the developing Australian canning industry. (Australian Fisheries Newsletter, December 1964.)

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SCALLOP SHELLS EXPORTED TO JAPAN:

A trial shipment of Tasmanian scallop shells has been made to Japan by a fishery firm in Sydney, Australia. Disposal of scallop shells has long been a problem to the Australian scallop industry, and the latest move to export them has aroused keen interest. It is believed that the shells shipped to Japan will be used to make shell jewelry and ornaments. A recent Australian overseas scallop market survey showed that there was a possible market in some countries, particularly Africa, for shells packed separately. (Australian Fisheries Newsletter, November 1964.)

Note: See Commercial Fisheries Review, November 1964 p. 76.

Brazil

U. S. SURVEY TEAM REPORTS ON POTENTIAL OF COMMERCIAL FISHERY:

The commercial fish production in the reservoir system of Northeast Brazil can be more than doubled by eradicating the predator fish--the piranha. That opinion is shared by a team of five fishery specialists of the U. S. Bureau of Commercial Fisheries which conducted a three-month study in Brazil aimed at developing the protein resources of the economically-depressed northeast area of that country. The study was made in cooperation with the Agency for International Development (AID) and the Alliance for Progress.

A detailed report by the survey team states that Brazil's major fishery development plans for the Northeast are basically sound and will lead to significant increases in fishery production, marketing, and consumption. It adds that the major road-block to fisheries development in that area is caused by inadequate financial and technical development.

The report recommends that AID and the Alliance for Progress favorably consider loans for developing all phases of the fisheries in Northeast Brazil. It proposes that at least 3 specialists from the United States be sent to Brazil for 1 or 2 years to assist in fish population studies, technology and marketing, and modernization of reservoir fishing fleets. Another recommendation concerns a program of fellowships and training grants for several professional fishery workers in Brazil who are regarded as potential leaders in fisheries science.

A review of Brazil's fresh-water fishery resources based on the survey team's report follows:

Northeast Brazil is a geographic region comprised of the States of Maranhao, Piaui,

Brazil (Contd.):

Ceara, Rio Grande do Norte, Paraiba, Pernambuco, Alagaos, Sergipe, and Bahia. In 1963, the population of the area was approximately 23.8 million people and represented one-third of the total population of Brazil.

In 1962, about 95,000 individuals in Northeast Brazil were considered professional fishermen (both fresh water and marine) and purchased licenses, compared to 257,000 fishermen for all of Brazil. Some of the professional fishermen in the northeastern area undoubtedly supplement their income by other part-time work. Other persons not classed as professional fishermen, fish for subsistence purposes and purchase no licenses. In 1962, the total catch of professional fishermen in Northeast Brazil was 283.4 million pounds (129,000 metric tons); the average catch per fisherman was estimated at slightly less than 3,000 pounds (1,360 kilograms). No separate estimates of the fresh-water and marine catch are available. In 1963, although the total catch of Northeast Brazil was not available, it was estimated that 110.2 million pounds (50,000 metric tons) of fresh-water fish were taken by professional fishermen. The most common types of gear used by professional fresh-water fishermen are gill nets and cast nets. By far the majority of fishing craft are pirogues and canoes, and are paddled by hand. A few fishing craft are equipped with sails.

No reliable estimate of the per capita fish consumption is available. Fish and other food production, however, does not satisfy the protein needs of the majority of people in Northeast Brazil. Agricultural production, for example, is hampered by recurrent droughts and floods, and the average income of individuals is low. Fish is highly acceptable as a food by nearly all people in Northeast Brazil. In the inland and coastal cities, the demand for fish exceeds the supply. Near the reservoirs, the supply exceeds the demand; distribution and preservation problems prevent the surplus from reaching the ready markets in the larger inland and coastal population centers. Of the 29 species of food fish taken in the reservoirs, the curimata (Prochilodus sp.) is the most important.

The principal fishery products produced and marketed in Northeast Brazil are fresh and salted fish. Reservoir fish is sold directly to consumers for immediate consumption and to truck owners for further sale and distribution. The truck owners transport the fresh and salted fish to nearby villages and the larger more distant cities, and sell to retail markets or ambulatory fish peddlers. While in transit, the fresh fish are carried iced in large boxes; the salt fish in bags.

Markets, particularly in villages, generally lack icing and cold-storage facilities. The marketing problems are associated not only with the marketing of fishery products, but also with the marketing of other fresh and salted meat products.

The principal Federal agency concerned with reservoir fishing activity in Northeast Brazil is the National Agency for Works Against the Drought (DNOCS). This agency, headquartered in Fortaleza, Ceara, has primary responsibility for the area largely within the Northeast known as the Drought Polygon. The Drought Polygon represents approximately 70 percent of the total area of Northeast Brazil, and contains by far the major share of the fresh-water fisheries. Fishery information and data on areas outside the Drought Polygon are very limited.

DNOCS controls 117 large reservoirs with a capacity of 2 million cubic meters of water or more within the Drought Polygon. This is the majority of large reservoirs in the Drought Polygon, but there are others not controlled by DNOCS. In addition, there are at least 3,000 small reservoirs with an average water capacity of 750,000 cubic meters within the Drought Polygon. The smaller reservoirs, and some large reservoirs, are not under the control of DNOCS: their control rests with state and municipal governments, and with private individuals.

In relation to the reservoir fisheries of the Northeast, DNOCS operates programs for piranha control, fish culture, and other activities:

Piranha Control: Piranha (Pygocentrus sp.) is particularly sensitive to rotenone, more so than other more desirable species, and succumbs in the presence of relatively small amounts (2-3 parts per million). After rotenone treatment of the Araras Reservoir, Ceara, in 1957-58, Dr. Osmar Fontenele remarked as follows: "Even if the economic results obtained from fishing were not so high, the sole advantage of freeing the livestock and the people from the carnivorous

Brazil (Contd.):

piranha would justify the cost of the work." DNOCS records indicate that catches in reservoir waters without piranha are as much as seven times more than those with piranhas.

Fish Culture: DNOCS conducts a fish-culture program for stocking all public and private waters in the Northeast, including reservoirs, lakes, and rivers. The DNOCS plan envisions the concentration of fish culture stations in key areas, where the greatest number of public and private reservoirs is located and can be serviced. Two stations are now in operation in the State of Ceara; one at Amanari Reservoir; another at Lima Campos Reservoir. Two stations are under construction at Itans Reservoir, Rio Grande do Norte, and at Jacurici Reservoir, Bahia. A fifth station is planned for Poco do Cruz Reservoir, Pernambuco. The location of each of the five stations is planned so that reservoirs will be serviced within a radius of roughly 150 kilometers (93 miles).

The fish-culture program has two major functions: (1) to supply the stocking needs of public and private reservoirs; and (2) to acclimatize and introduce new species. The reservoir needs for brood stock fish are great and will increase in the next few years.

Other Activities: DNOCS directs a system known as the "Guarita da Pesca" (Fisheries Law Enforcement, Tax, and Marketing Section) on the large reservoirs under its control; the system consists of collecting statistics and taxes on the fish catch, issuing fishing licenses, enforcing fishing relations, and providing landing, processing, and marketing facilities. The DNOCS plan to improve and expand reservoir landing, processing and marketing facilities, is part of the "Guarita da Pesca" system. The plan is to improve and construct facilities at six reservoirs, namely, Araras Reservoir, Ceara; Pentecoste Reservoir, Ceara; Oros Reservoir, Ceara; Curema Reservoir, Paraiba; Jacurici Reservoir, Bahia; and Poco do Cruz Reservoir, Pernambuco. Modest accommodations and fish-landing facilities will be built at the smaller stations around the reservoirs. Ice, gear, and other supplies will be made available to fishermen at cost. Instruction and extension-type services are planned at the stations for the benefit of the fishermen. A limited number of stations at each reservoir will be developed into larger marketing centers; they will have cold-storage facilities and ice-making plants, and will serve as supply stations and distribution points for fish destined for the markets of the larger cities. The plan, if carried out, will (1) greatly improve conditions and efficiency in fish handling, processing, and marketing; (2) improve the quality of fishery products; (3) facilitate the movement of increased amounts of fishery products through domestic trade channels to the consumer; and (4) undoubtedly result in increased economic benefits to the fishermen, wholesalers, and retailers.

--By Robert Balkovic, Loyal G. Bouchard, John Crum, J. Bruce Kimsey, Charles Lee, and Wm. Ellis Ripley.

Canada

TUNA PURSE SEINER LAUNCHED AS EAST COAST TUNA PROJECT MOVES FORWARD:

The Golden Scarab, one of the world's largest tuna seiners, was launched November 4, 1964, by a Quebec shipyard. Scheduled to begin her maiden voyage in January 1965, the vessel is expected to start a tuna canning industry on Canada's East Coast. A sistership, the Silver Scarab is under construction. Each vessel will have a capacity for 780 tons of frozen tuna. The vessels will deliver their catch to a tuna cannery being built at St. Stephen, New Brunswick. The cannery expects to be in operation by June 1965 and to sell $3 million worth of canned tuna in 1966.

The Golden Scarab and the Silver Scarab each cost $1.8 million of which 40 percent was contributed by the Canadian Federal Government and 10 percent by the Province of Quebec under fishing vessel subsidies.

The Golden Scarab measures 170.5 feet overall. Powered by a 10-cylinder Diesel engine developing 1,666 horsepower, she will have a loaded service speed of 12.5 knots at 750 r.p.m. Cruising range is 18,000 miles, and the vessel can stay at sea for 120 days. The vessel's refrigeration plant holds fish at 15° F. It is operated by three ammonia compressors. A helicopter will be carried by the Golden Scarab to scout fish.

The nylon seine of the Golden Scarab weighs 28 tons and is 4,000 feet long and 420 feet deep. It is reported to be one of the largest seines ever built.

The tuna canning plant being built in New Brunswick may be closer than California to some of the traditional Pacific tuna grounds off Central and South America. Also, the two vessels will exploit the large skipjack and bluefin tuna populations of the Atlantic. Each vessel is expected to land about 3,000 tons of tuna a year. (Western Fisheries, December 1964.)

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LARGE STERN TRAWLER LAUNCHED:

The largest trawler ever built in Canada, Acadia Albatross, was launched on November 23, 1964, from a shipyard in Lauzon, Quebec.

The Acadia Albatross is a stern trawler with a shelter deck. It is said to be capable of catching and handling 7 million pounds of fish a year.

Canada (Contd.):

Main specifications of the vessel are: length overall 152 feet, length between perpendiculars 130 feet, breadth molded 33 feet, depth molded (shelter deck) 22¾ feet, and gross tonnage about 625 tons.

The vessel is of all-welded steel construction and is strengthened for navigation in ice. It has a raked soft-nosed stem (flared at bow) and a wide stern with ramp (with gates fitted between bulwarks at the top of ramp). The new trawler has two continuous decks. Machinery and accommodations are located forward of amidships.

A fixed type of fishing gantry is fitted on the shelter deck aft at stern. Forward of the stern ramp is a fish-handling gantry which, in combination with another gantry formed by the exhaust pipes, handles the fish and fishing equipment.

The deck machinery, which is generally of the electrically-operated type, consists principally of one 4-barrel trawl winch situated on the shelter deck aft of the bridge and two 1-ton capstans located right aft on the shelter deck.

The washing and handling of fish is done under cover between decks. Fish are landed on the shelter deck and then led through a hatch to the fish-handling area below. There the fish are cleaned. After cleaning, the fish are taken by conveyor belts to three hatches serving the insulated fish hold. All doors and hatches in the system are hydraulically-operated.

The vessel is equipped with modern navigational aids including radar, radiotelephone, loran, and echo-sounders arranged on a central console in the wheelhouse.

Popuision is by marine Diesel engine and controllable pitch propeller controlled directly from the wheelhouse. (Canadian Fisherman, January 1965.)

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FLOATING FISH FACTORY PLANNED:

A $500,000 floating fish plant to process groundfish fillets is to be built in Liverpool, Nova Scotia, and is expected to be in operation early in 1966, according to the Trade and Industry Minister of Nova Scotia.

The project is being developed by a private firm with the aid of a $190,000 subsidy from the Maritime Commission of Nova Scotia. In addition, a $390,000 loan for the project was approved by the Nova Scotia Government.

Three fishing vessels being built to help supply fish to the floating plant will boost the overall cost of the project to more than $1,000,000.

The plant will be built on a floating barge (160 feet long and 40 feet wide) because preparation of a land site in Liverpool was not economically feasible. The floating plant will be capable of handling about 10 million pounds of groundfish annually on its production line. About 60 people will be employed at the plant.

The floating plant will have three decks. Storage space and a compact fish meal plant to use fish waste will be housed on the bottom level. Upper decks will be for holding, processing, freezing, and cold-storage facilities.

Fish will move in a straight line from a conveyor bringing them to the upper deck through various processing stages. Processed fish will be dispatched for fresh shipment or freezing and cold-storage.

The floating fish factory will create jobs in the Liverpool area, not only through plant employment but also by making a ready market available for inshore fishermen.

"The eventual application of such a plant, and others like it, would be to move it to areas not served by nearby land-based plants," a company spokesman said. "For example, such a plant could be moved to a Gulf of St. Lawrence site during good fishing periods, then be moved out when ice closed harbors. This type of plant construction also cuts other costs, particularly public works such as piers and highways." (Fishing Gazette, November 1964.)

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FEDERAL-PROVINCIAL BRITISH COLUMBIA FISHERIES COMMITTEE MEETS:

Topics of vital importance to British Columbia fisheries were discussed at a meeting of the Federal-Provincial British Columbia Fisheries Committee held in Ottawa, during November 1964. The Committee reviewed problems affecting the maintenance and development of the salmon resource in fresh-water areas. The problems include the effects of logging, gravel removal, pollution, and other water-use projects upon the fresh-water environment. Ways of assuring that major salmon spawning areas be preserved are to be explored with the appropriate government departments.

At the meeting, the need was recognized for long-term studies dealing with the effects of patterns of forest cover removal on the capacity of streams to produce salmon. Because of the major problem of pollution, the Committee recommended the establishment of a program working party to review pollution studies of various fisheries agencies.

Canada (Contd.):

The Committee discussed the existing administration of the oyster resource. It was agreed that the management of the oyster fishery and its public health aspects require review. The Committee accepted the fact that further experimentation and research are desirable to develop more effective utilization of oyster grounds, and concurred that a review of purification techniques for possible application in the Pacific area would be of value. The subject of administration of the oyster resource is to be discussed with other agencies concerned at the next meeting of the Committee.

Sport and commercial salmon fisheries also were on the agenda for the meeting. While the Department of Fisheries of Canada is responsible for administration of those fisheries in tidal waters, their well-being is of importance to the Province of British Columbia. Because the sport fishery is expanding rapidly and is related to tourism, the province expressed interest in the status of the chinook and coho fisheries in the Gulf of Georgia and Victoria areas where the major concentration of the sport fishery is found.

A subcommittee is to be formed to periodically consider tidal salmon sport fishing regulations and conservation problems with respect to coho, chinook, and steelhead salmon. (Canadian Department of Fisheries, November 26, 1964.)

Note: See Commercial Fisheries Review, November 1964 p. 79.

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SYMPOSIUM ON THE ECONOMIC ASPECTS OF SPORT FISHING:

A 3-day symposium on the economic aspects of sport fishing was held in Ottawa, Canada, January 5-7, 1965. It was sponsored by the Department of Fisheries of Canada. The meeting was attended by about 75 biologists, administrators, and economists from all parts of Canada, as well as several from the United States.

The meeting was opened by the Canadian Federal Deputy Minister of Fisheries who said that the Canadian Government was aware of the difficulty in reconciling the regulation of fisheries for commercial purposes with those of recreation. While it is relatively easy to assess the value of commercial fisheries, it is very difficult to do so for sport fishing. The recreational value in itself is important, and in addition, sport fishing, like commercial fishing, supports a large industry. If fisheries are to be regulated in the best interests of the people, however, something must be known of the value of sport fishing as well as commercial fishing.

The Chairman of the Fisheries Research Board of Canada said that problems faced by economists in considering the sport fisheries held similarities to those which faced biologists in fish population studies.

A paper prepared by Dr. Marion Clawson, of Washington, D.C., was read at the symposium. The paper detailed the extent of the boom in outdoor recreation in the United States and explained that the basic factors underlying the outdoor boom were population changes, growth in per capita income, improved travel facilities, and increased leisure. As total population has grown, so has the number of elderly retired and semiretired people and the number of young people not yet in the labor force, two classes with special demands for outdoor recreation.

In foreseeing a greater demand for sport fishing in the future, Dr. Clawson said that perhaps it would also be less discriminating, and that a period of "mass fishing" may develop before too long. The problems of those responsible for fisheries management could then shift from fish to people--how to educate, help, guide, and hopefully satisfy the recreationists seeking some fishing, consistent with proper management. That would inevitably impose new and different burdens upon researchers and managers alike. Traditional methods would no longer suffice and greater research would be needed.

Information on expenditures made by fishermen is often collected, but its value is by no means clear. The major question is what items of expenditure to include and how to assess the value of the sport fishery in monetary terms, apart from its known value from a recreational standpoint.

The symposium on sport fisheries included panel discussions on "The Basis for an Economic Approach," "Techniques and Methods of Evaluation," "The Economics of Management," "Research Requirements," and "Statistical Needs."

The growth of sport fishing was given further emphasis during the panel discussion on research requirements. Although many of the untold thousands of sport fishermen may be inefficient, the results of their activities can be "terribly effective" with regard to fish stocks.

The panel on research requirements received a paper by the Director of the Atlantic Laboratory of the U. S. Bureau of Sport Fisheries and Wildlife. He discussed the need for research in salt-water sport fisheries. By 1960, he said, over 6 million anglers were fishing at one time of the year or another along United States coasts. They were spending about $626 million in pursuit of their sport and were increasing in numbers by about 350,000 a year. In the case of some species of fish, sportsmen account for a larger catch than commercial fishermen.

A basic need in a program of sport fishery research, he said, is statistics which are comprehensive, systematic, and accurate. How to gather such data is a problem.

He said the habits of fishermen, as well as of fish, must be studied. The livelihood of many people depends on sport fishing. There have been many changes in the use of fishery resources and in the public's attitude toward them. These changes must give direction to research requirements.

Canada (Contd.):

A paper discussing the biological research required in management of fresh-water sport fisheries was presented by a Canadian scientist from Vancouver, B.C. He discussed research bearing on physical and chemical aspects of the fresh-water environment as well as of that pertaining to fish and other organisms of importance to sport fish. He also stressed that man himself was a biological factor with which research was involved.

The final paper on research requirements was presented by a scientist from Acadia University, Wolfville, N.S. He stated that there is a need for units to measure supply, and that until a curve can be drawn showing the long-run supply of sport fish resources, a complete range of economic problems defies or eludes economic analysis. It is possible to obtain information about the utilization of the resource in real terms such as in rod days and number of fishermen, but such information falls short of that necessary for the analysis of demand in terms of money.

The last panel discussion was on statistical needs in the marine sport fishery for Pacific salmon in British Columbia. The paper on which that discussion was based was prepared by a member of the Canadian Department of Fisheries in Vancouver, B.C. He said that neither the existing statistics nor the methods by which they are gathered are adequate to the challenge now emerging in the recreational salmon fishery. Major programs of biological study have already been undertaken on sport fishing and these need to be matched with at least a comparable level of catch and effort information.

At the close of the symposium, the Canadian Deputy Minister of Fisheries said he hoped that the stimulating statements which emerged during the conference would increase efforts to find a way to make meaningful economic analyses of the sport fisheries.

A summary of the discussion at the symposium was given by the Director of the Namaimo, B.C., Biological Station of the Fisheries Research Board of Canada. He spoke of the difficulties encountered by biologists and economists in assessing the value of a recreation such as sport fishing because of the variety of intangibles involved. He thought that more attempts should be made to forecast trends in sport fishing so that future demands on the resource might be better assessed. (Canadian Department of Fisheries, Ottawa, January 5 and 7, 1965.)

Cyprus

TERRITORIAL WATERS
OF 12 MILES CLAIMED:

An extension of the territorial waters of the Republic of Cyprus to 12 miles was declared by law No. 45 of the Cypriot Parliament, published August 6, 1964. The action was protested by the Turkish Government, which claimed that Turkish Cypriot Representatives had been barred from the Cypriot Parliament and prevented from taking part in deliberations which led to the new law on territorial waters. (Turkish Permanent Mission to the United Nations, New York, December 22, 1964.)

Denmark

WESTERN EUROPEAN
FISHERIES CONVENTION RATIFIED:

The Danish Parliament approved on May 29, 1964, Special Bill XVI agreeing to Denmark's ratification of the March 9, 1964, London Fisheries Convention approved at the Western European Fisheries Conference in London. The Danish documents were deposited in the United Kingdom archives in London on October 9, 1964.

Danish fisheries limits have not been extended pending discussions with neighboring countries having historic fishing rights under the Convention, and approval of a new Salt Water Fisheries Law still under consideration in the Folketing. Danish Fisheries Ministry officials stated extension of limits probably would occur at the same time as passage of the Salt Water Fisheries Law. (Regional Fisheries Attache, United States Embassy, Copenhagen, January 13, 1965.)

Note: See Commercial Fisheries Review, August 1964 p. 61.

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SEAL SKINS FROM ALASKA
INCLUDED IN AUCTION OF
GREENLAND SEAL SKINS:

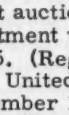
The Royal Greenland Trade Department held one of its regular auctions for Greenland seal skins on September 9, 1964, in Copenhagen, Denmark. Included in the auction for the first time were 2 lots of Alaska hair seal skins designated as Alaska rangers (from younger and smaller seals) and Alaska saddlers (from older and larger seals). There have been reports that the Alaska seal skins were taken from southwestern and central Alaska by bounty hunters.

During the auction, a total of 21,316 ringed seal skins from Greenland were sold at an average price of US$20.40 a skin. A total of 849 other Greenland skins (from harp, bladder-nosed, and saddle seals) were sold at somewhat higher average prices.

Denmark (Contd.):

A total of 2,450 Alaska ranger seal skins were sold at an average price of $33.20 a skin. The price spread for the Alaska rangers was $31.10-38.40 for 2,000 prime young washed skins and $22.45-39.80 for 450 prime old washed skins. A total of 50 Alaska saddler skins were sold for $36.90 each.

It was reported that the Alaska seal skins were not sorted as uniformly as is the practice for Greenland skins. Better prices for the Alaska skins would be expected if they were sorted more uniformly. It was not known if more Alaska seal skins would be offered at the next auction of the Royal Greenland Trade Department which was scheduled for February 1965. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, November 11, 1964.)



Ecuador

CANNED TUNA EXPORTED TO BRAZIL:

An Ecuadorean tuna cannery owned by United States interests has announced its first shipment of canned tuna to Brazil. The shipment consisted of 1,500 cases (48 1-lb. cans) of fancy solid pack. The sales manager of the Ecuadorean tuna cannery, which is located at Manta, had to make several trips to Brazil to develop the sale. (United States Embassy, Quito, December 11, 1964.)

Faroe Islands

FAROESE VESSEL TO LONG LINE FOR TUNA IN CARIBBEAN:

The Faroese owners of the M/V Skugvur plan to send the vessel to the Caribbean to long line for tuna. Built in a Norwegian shipyard during 1964, the vessel has already made a trip to the northeast coast of the United States to long line for porbeagle (herring shark).

Main dimensions of the Skugvur are: length 172 feet, breadth 30 feet, depth 16 feet, and tonnage 646 gross tons (312 net tons). Speed is 12 knots.

The vessel is equipped with the latest electronic aids to fishing and navigation. The engine is automatically-controlled from the bridge. A variation of the Kort Propellor enables the vessel to make tight turns during purse-seine operations. The vessel is air-conditioned for work in tropical waters. It carries fresh-water generators with a capacity for distilling 2 metric tons of fresh water a day and a flake-ice machine with a capacity of 3 tons a day. The vessel has two blast freezers which can freeze 20 tons of fish a day at -10° F. Lower temperatures can be reached, but with reduced daily output.

The Skugvur was built for the porbeagle fishery. Owing to a combination of poor fishing and unfavorable conditions in the Italian market for porbeagle, the owners have decided to try the vessel at tuna long-lining in the Caribbean, probably operating out of Barbados in the West Indies. The vessel had been considered for use in conjunction with a United States-Somali fishing project which was cancelled in 1964. It recently carried a cargo of frozen fish fillet waste for use as mink food from Nova Scotia to Norway. (Assistant Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, January 6, 1965.)

Greece

FREEZER-TRAWLER FISHERY TRENDS, SEPTEMBER 1964:

Landings: The Greek fleet of Atlantic freezer-trawlers landed 14,749 metric tons of fish in the first 9 months of 1964 compared with 14,352 tons in the same period of 1963 and 11,888 tons in January-September 1962.

Exports: One of the Greek fishing companies operating freezer-trawlers in the Atlantic has sold Bulgaria 400 tons of frozen fish (mackerel and horse mackerel). The shipment was delivered to the port of Pyrgos (Burgas), Bulgaria, by the Greek firm's refrigerated vessel Evangelistria V. The same Greek firm has also exported 50 tons of frozen cuttlefish and squid to Italy, and has prospects for further exports.

Freezer-Trawler Fleet Expands: Nine additional freezer-trawlers are scheduled to join the Greek fleet in 1965 and fish off Northwest Africa. The new vessels were acquired from foreign owners in Germany, France, and Iceland. The vessels are being adapted for

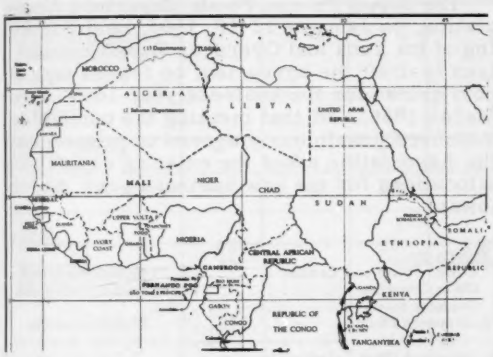
Greece (Contd.):

work as freezer-trawlers by shipyards in Piraeus (Piraievs), Greece. (Alieia, October 1964.)

Guinea

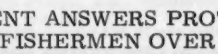
TERRITORIAL WATERS OF 130 MILES CLAIMED:

By Presidential Decree No. 224 dated June 3, 1964, the Government of Guinea declared its territorial waters were extended to 130 nautical miles calculated on the basis of straight baselines.



The United States has declared that a unilateral extension of territorial waters is not recognized under international law, and that the United States reserves its rights and those of its nationals in the waters in question. The extension of Guinean territorial waters was also protested by the Japanese Government.

It appears that the purpose of the extensive territorial waters claim by Guinea was to establish an exclusive 130-mile fishing preserve for Guinean fishermen.



Ireland

GOVERNMENT ANSWERS PROTESTS BY LOCAL FISHERMEN OVER SPANISH LANDINGS AT IRISH PORT:

Angry demonstrations by Irish fishermen marked the arrival in early December 1964 of a Spanish trawler to unload fish at the Irish port of Galway. Protests were also made to the Irish Parliament. Involved in the conflict is a fish-processing factory at Galway which needs regular raw fish supplies to meet export requirements for fish sticks, fish balls, and related products. Landings by Irish fishermen have been inadequate to meet the factory's requirements, so a Spanish trawler was licensed by the Government of Ireland to supplement domestic supplies.

In the Irish Parliament on December 9, 1964, a Government spokesman defended the issuance of the license to the Spanish trawler. He emphasized the importance of the processing sector of the fishing industry in the development of a national fisheries policy; factories must be assured of regular and adequate supplies. He said contractual arrangements between Irish fishermen and the factories would be promoted so that adequate supplies would be available from Irish sources. But until that was done, landings of fish by foreign trawlers to supplement rather than supplant local catches was necessary so that export orders could be met. Since those landings would be processed and re-exported, the interests of Irish fishermen would not be adversely affected. (United States Embassy, Dublin, December 11, 1964.)

Ivory Coast

FISHERY DEVELOPMENT PLANS BEING REALIZED:

Plans for the development of the commercial fisheries of the Ivory Coast were being realized by the end of 1964 when the construction of warehouses for fishing gear and equipment and other auxiliary buildings was completed. Most of the new buildings were in operation but construction of the cold-storage plant (planned for the new "Port de Peche" or Fishing Port), which had been reported as being 25 percent completed in the summer of 1964, had not been started as of the beginning of 1965.

Specifications for the cold-storage plant were changed from a storage capacity of 1,500 tons to at least 3,000 tons. Construction bids from 4 companies (2 French and 2 United States firms) were to have been submitted this past January. It was reported that actual construction of the plant would be delayed until the completion of at least part of a new

Ivory Coast (Contd.):

1,300-foot L-shaped addition to the dock of the same length, which has been completed and is in use. This will probably be about the latter part of 1965. (Fisheries Attache, United States Embassy, Abidjan, January 9, 1965.)

Note: See Commercial Fisheries Review, October 1964 p. 60.

Jamaica

FISHERIES DEVELOPMENT PROJECT CONSIDERED:

An offshore fisheries development project costing Ł3.5 million (US$9.8 million) is being considered by the Jamaican Government, according to an announcement by the Jamaican Minister of Development and Welfare. The Minister mentioned the project on October 20, 1964, when he opened the Jamaican annual All-Island Fishermen's Cooperatives Conference. The conference was attended by representatives from the 65 fishing cooperatives in Jamaica. The Minister told the conference that the development project under study proposed not only to improve fisheries landings for domestic consumption but also to provide an export surplus. The proposal has provisions for a fish-canning operation, and the over-all project could lead to the employment of 1,000 people.

Pointing out that Jamaica was continuing to import canned fish, the Minister said he would like the country to become self-sufficient in fish with an export surplus. He said Jamaican landings of fish in 1963 totaled 1,500 tons. The Minister strongly supported the principle of operating through fishery cooperatives.

The Minister also told the conference about the fisheries project in the Caribbean region sponsored by the United Nations Special Fund. The Special Fund project is designed to provide through exploratory fishing, market studies, and training, a basis for fisheries development in Caribbean countries. The cost of the project to the Special Fund will be about $1.5 million. The Caribbean countries participating will contribute about $750,000. The Minister emphasized that the proposed Jamaican fisheries project was separate from and in addition to the United Nations Special Fund project in the Caribbean. (United States Embassy, Kingston, November 26, 1964.)

Japan

FROZEN TUNA EXPORT QUOTAS FOR FY 1965:

The Japan Frozen Foods Exporters Association, on January 12-13, 1965, held a meeting of its Tuna and Overseas Base Committees to draft the agreement on frozen tuna export quotas for the business year 1965 (April-March 1966). At that meeting the committee members unanimously agreed to propose that the Association adopt the existing export quota allocations for the new business year, as follows:

Exports to:	
United States and Canada	110,000 short tons[1]
Other Countries	70,000 metric tons
Overseas Bases:	
American Samoa	25,000 short tons
Fiji Islands	9,000 " "
Noumea (New Caledonia)[2]	7,500 " "
Espiritu Santo (New Hebrides)	6,000 " "
Penang (Malaysia)	6,000 " "
Saint Martin (West Indies)	2,000 " "

1/Excludes exports of tuna loins and frozen tuna transshipments from overseas bases.

2/Base, established in 1963, no longer exists but quota continues to be allocated. The fishery firm assigned the quota can utilize it by reactivating base or by obtaining permission to transfer quota to another overseas base.

Source: Suisan Tsushin, January 14, 1965.

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EXPORT VALIDATIONS OF FROZEN TUNA AND TUNA LOINS TO U.S., JANUARY-NOVEMBER 1963-64:

Japan's export validations of frozen tuna and frozen tuna loins to the United States in November 1964 totaled 7,723 short tons. Of that total, 62.5 percent were albacore tuna, 24.8 percent yellowfin, 1.4 percent skipjack, and 11.3 percent tuna loins.

During January-November 1964, Japan's export approvals amounted to 104,480 short tons, an increase of 32,236 tons or 44.6 percent more than the 72,244 tons exported during the same period in 1963. On a species basis, albacore exports were up 67.9 percent, yellowfin 30.5 percent, skipjack 5.9 percent, and tuna loins 12.2 percent. Exports of big-eyed tuna were down 2 percent. Only one ton of bluefin tuna fillets was exported as compared with 374 tons shipped during the same period in 1963.

Japan (Contd.):

Japan's Export Validations of Frozen Tuna and Tuna Loins to U. S., January-November 1964 with Comparisons

Species	November 1964			January-November 1964			January-November 1963			1963
	Direct	Trans-shipped	Total	Direct	Trans-shipped	Total	Direct	Trans-shipped	Total	Total
	(Short Tons)									
Albacore, round	1,347	3,478	4,825	24,351	32,099	56,450	11,220	22,396	33,616	36,737
Yellowfin:										
Round	-	130	130	-	1,535	1,535	-	861	861	
Gilled and gutted:										
20/100 lbs.	1,087	469	1,556	25,291	4,010	29,301	18,348	3,976	22,324	
100 lbs. up	34	-	34	2,381	-	2,381	1,248	-	1,248	
Dressed with tail	9	186	195	87	4,537	4,624	-	4,160	4,160	
Fillets	-	-	-	33	12	45	296	132	428	
Total	1,130	785	1,915	27,792	10,094	37,886	19,892	9,129	29,021	33,370
Big-eyed:										
Gilled and gutted	-	4	4	30	39	69	24	4	28	
Dressed with tail	-	-	-	-	201	201	-	240	240	
Fillets	-	-	-	37	3	40	6	42	48	
Total	-	4	4	67	243	310	30	286	316	316
Bluefin, fillets	-	-	-	-	1	1	-	374	374	374
Skipjack, round	-	106	106	8	3,135	3,143	-	2,967	2,967	3,762
Loins:										
Albacore	537	-	537	3,283	-	3,283	2,707	-	2,707	
Yellowfin	336	-	336	3,407	-	3,407	3,086	-	3,086	
Bluefin	-	-	-	-	-	-	157	-	157	
Total	873	-	873	6,690	-	6,690	5,950	-	5,950	6,183
Grand Total	3,350	4,373	7,723	58,908	45,572	104,480	37,092	35,152	72,244	80,742

Source: Japan Frozen Food Exporters Association.

Frozen tuna and tuna loins approved for export during January-November 1964 exceeds the total amount exported during all of 1963 by 23,738 tons. (Fisheries Attache, United States Embassy, Tokyo, December 18, 1964.)

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TUNA FISHING AND MARKET TRENDS:

Japanese tuna vessels early in January 1965 were shifting their operations from the winter albacore fishing grounds in the western Atlantic to the yellowfin grounds in the eastern Atlantic. Average catches of 3-4 metric tons a day, consisting of 60 percent yellowfin, were reported.

Exports of frozen dressed yellowfin tuna to Italy brought US$420 a metric ton c. & f. In comparison, frozen gilled-and-gutted yellowfin tuna exported to the United States from Japan proper were quoted at $370-375 a short ton c. & f. Frozen round albacore for export to the United States were quoted at $270-275 a short ton f.o.b. port of delivery, Africa. (Suisan Tsushin, January 18, 1965, and other sources.)

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TUNA VESSEL RESEARCH GROUP TO BE FORMED:

In an effort to assist the tuna fishing industry in stabilizing the management of fishing vessels and in improving working conditions aboard those vessels, the Japanese Fisheries Agency plans to organize a research group to develop ways and means of reducing manpower on tuna vessels. Under the plan announced by the Agency, a research group comprised of leading experts from the Government and industry will be organized and placed under the supervision of the Agency's Production Division Chief Kamenaga. Its activities will be carried out in cooperation with the Japan National Tuna Research Council.

Japan (Contd.):

Projects to be assigned to the research group include the design and development of: (1) equipment to mechanize fishing operations on tuna long-liners; (2) mechanical devices to facilitate fish handling and freezing aboard the vessel; (3) automatic steering mechanism for slow-speed vessel operation during fishing; and (4) other technological improvements of fishing vessels. The projects are tentatively scheduled for completion by the end of 1965. (Suisancho Nippo, December 28, 1964.)

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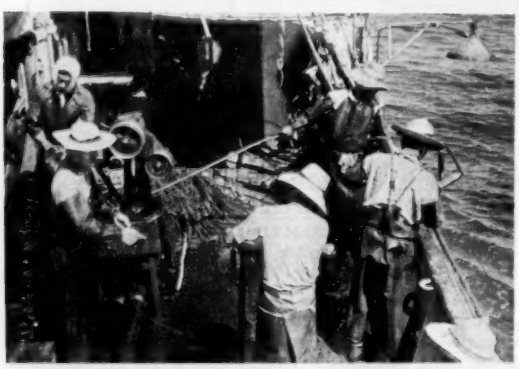
TUNA MOTHERSHIP FISHERY TRENDS IN SOUTH PACIFIC:

The Japanese tuna mothership Shinyo Maru (3,800 gross tons) returned to Tokyo on January 15, 1965, after a 103-day trip to the South Pacific. The mothership returned with 3,164 metric tons of frozen fish, consisting of 46 percent albacore tuna, 15 percent yellowfin tuna, 7 percent other tuna species, 20 percent spearfish, 8 percent shark, and 4 percent miscellaneous species. The Shinyo Maru's operation is said to have ended in a deficit due to lower than anticipated production and the preponderance of albacore in the catch, prices for which are presently depressed. Catcher vessels fishing for the mothership totaled 34, including two transport vessels. They averaged 1.92 metric tons of fish a day.



Retrieving long-line gear aboard a Japanese tuna long-line catcher boat. Note the long-line hauler.

The tuna mothership Yuyo Maru (5,500 gross tons), which belongs to the same firm that owns the Shinyo Maru, is scheduled to depart for the South Pacific in mid-May. The Yuyo Maru made a profit on its last trip. On the other hand, another fishery firm recorded a loss in its South Pacific tuna mothership operation in 1964, and it does not plan to conduct mothership-type operations in 1965. That firm's fleet, led by the mothership Nojima Maru (8,800 gross tons), operated in the vicinity of Tahiti in the summer of 1964. (Suisan Tsushin, January 18, 1965.)

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TUNA PURSE-SEINE FLEET OFF WEST AFRICA REPORTS POOR FISHING:

The Japanese tuna purse-seine fleet, led by the mothership Chichibu Maru No. 2 (1,639 gross tons), has been operating in the waters off West Africa. It reported poor fishing at the end of 1964 and in early January 1965. The fleet began fishing on November 17 and, except for a short period soon after it commenced operations, fishing has been poor. (Suisan Tsushin, January 13, 1965.)

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TUNA CANNERS ADOPT NEW SALES PROCEDURE:

The Japan Export Tuna Packers Association, at a directors meeting held January 8, 1965, to discuss the new export sales procedure approved at the previous directors meeting, formally adopted the original proposal and supplementary provisions as follows:

1. Packers will contract sales with exporters who have outlets in the United States and who will aggressively promote sales to help establish a firm market in that country for Japanese canned tuna.

2. Sales goal will be the attainment of the 1965 canned tuna in brine import quota admissible into the United States under the lower duty rate of 12½-percent ad valorem. However, when market conditions indicate it would be advantageous to export canned tuna in excess of that quota (packers to assume obligation of paying for the increase in duty), a decision on whether to exceed the quota admissible under the lower duty rate will be made each time such a situation occurs.

3. Exporters will present their annual sales plan within a specified date to the Packers Association on forms to be prescribed separately.

4. With regard to advance purchase orders submitted by exporters on the basis of their an-

Japan (Contd.):

nual sales plan, the Sales Committee (representing packers), in consultation with the exporters, will determine the quantity of advance orders in a manner which would enable exporters to fulfill their targets. As a rule, supplementary contracts will not be made.

5. To assure sales and shipment of canned tuna purchased in advance, the exporters will conclude purchase contracts with packers on a progressive scale based on their sales plan.

6. The advance purchase plan will be formulated on a quarterly basis if that is considered particularly advisable under prevailing circumstances.

7. The basic sales contract and the sales contract to be drawn up will stipulate sales conditions. The basic sales contract shall be drawn up at the time that the quantity of advance purchase is determined by the exporters on the basis of their annual sales plan. The sales contract shall be prepared each time a sale is transacted.

8. A reasonable sales price based on existing market conditions in the United States will be determined by the packers at the directors meeting. When a price change becomes necessary, it will be announced as early as possible.

9. Packers may designate outlet (trading) firms to handle their allotted production quotas, in which case they must notify the packers association. Such packers may consult their outlet firms on matters related to the kind and size of pack. The Packers Association will recognize such firms as designated exporters so long as this presents no special problem. When necessary, the Association will give those firms priority over other firms in handling the sale of canned tuna products.

10. The kind and size of pack to be put up by packers who do not have their own designated outlet (trading) firms will be determined under the usual method following consultations with exporters.

11. Joint accounts and other matters, including those related to delivery, will be handled in the same manner as before.

Supplementary provisions: (1) It is understood that the advance purchase orders stipulated in Paragraph 4 will be submitted to the Tokyo Canned Tuna Sales Company; and (2) it is further understood that the provisions in Paragraphs 9 and 10 are applicable provided they present no problem, and that those provisions shall be studied further. (Suisan Tsushin, January 9, 1965.)

Note: Japanese canned tuna exporters and packers have not yet reached settlement on a new agreement covering the export of canned tuna to the United States for the business year December 1964-November 1965. The preceding 11-point proposal prepared by the packers has been submitted to the Exporters Association for its concurrence.

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DEVELOPMENTS ON SUSPENSION OF CANNED TUNA EXPORTS TO UNITED STATES:

According to an article in the Japanese periodical Nihon Kogyo, December 15, 1964, Japan stopped exporting canned tuna to the United States as of December 1, 1964. The reason for the suspension was because of a difference of opinion between Japanese canners and traders on the policy for the sale of canned tuna to the United States during the business year 1965 (begins December 1). Canned tuna packers have been shipping their products for export to the Japan Canned Tuna Export Fisheries Union. That Union has been exporting the products after consulting with the Japan Canned Food Export Union.

Japanese tuna canners were scheduled to hold a meeting of the Board of Directors on December 16 to again discuss their export policy. It was reported that the keynote of their policy is to "establish in the United States a market for Japanese canned tuna," but with no intention to change the policy of relying on the big trading firms for greater sales. They also hold that the canners can designate their trading firms within the framework of production, while the trading firms' agreement calls for export quotas based solely on the actual exports in the preceding year.

It was pointed out that it is necessary for the canners and trading firms to reach an agreement through talks, apart from whether or not the trading firms' agreement should be recognized. It was reported that the Japanese Fisheries Agency strongly wants such an agreement.

The Japanese report that sales of Japanese canned tuna in the United States dropped in

Japan (Contd.):

1964, and that inventories of the Japanese product in the U.S. total 400,000 or 500,000 cases.

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TUNA INDUSTRY URGED TO REDUCE RELIANCE ON GOVERNMENT ASSISTANCE:

Japanese tuna industry leaders, on December 24, 1964, held a meeting in Tokyo to exchange views with State Minister Ichiro Kono and Fisheries Agency officials on problems confronting the depressed tuna industry. Matters discussed at that meeting included the voluntary reduction of the fishing fleet, international regulation of the tuna fisheries, labor-management improvement, and tuna price problems.

In addressing the industry leaders, the State Minister commented on the great gap between his views and those of industry. He expressed the hope that industry would understand that the Government's fishery policy is changing with the times. Heretofore, the Government had pursued a protective policy for the producers, but with changing economic conditions main emphasis of the administration's policy must be directed toward the consumers. The Minister stressed that the industry should try to resolve its own problems and seek government assistance only where such help is needed, and that it must first of all reduce production costs to successfully compete with other countries. (Suisancho Nippo, December 25, 1964.)

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GOVERNMENT ARBITRATES ALLOCATION OF BERING SEA KING CRAB PRODUCTION QUOTA:

The nine Japanese fishing companies which jointly operate the king crab factoryships Tokei Maru (5,385 gross tons) and Dainichi Maru (5,858 gross tons) in the eastern Bering Sea were unable to resolve their differences of views on the allocation of the reduced king crab production quota of 185,000 cases. That quota was agreed to at the negotiations held between Japan and the United States in the fall of 1964. Thus the firms arranged for the Fisheries Agency to arbitrate their dispute. On January 16, 1965, the Agency ruled that each company's quota would be reduced by 21.28 percent. The fractional shares of less than one case, totaling three cases, were allotted to the firm with the smallest production quota. The annual quota for 1965 and 1966 for the Tokei Maru fleet (operated by 4 firms) is 94,467 cases and the Dainichi Maru fleet (operated by 5 firms) 90,533 cases.

Those two factoryships will be licensed to operate in Bristol Bay during the 1965 season until the king crab production quota of 185,000 cases (48 $\frac{1}{2}$-lb. cans) is attained. Production by the two vessels in 1964 was 235,000 cases. (Suisan Tsushin, January 18; Suisan Keizai Shimbun, January 12; Fisheries Attache, United States Embassy, Tokyo, January 22, 1965.)

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COMPOSITION OF BERING SEA BOTTOMFISH FLEETS:

On January 19, 1965, the Japanese Fisheries Agency submitted for consideration of the Central Fisheries Coordination Council (highest Government-industry advisory body on fisheries matters) a list showing the composition of the mothership-type bottomfish fleets scheduled for operation in the Bering Sea in 1965. According to the Agency's sub-

Typical Japanese small otter trawler in the Bering Sea fishing for a mothership.

Composition of Bering Sea Mothership Bottomfish Fleets, 1965

Mothership	Size	No. Catcher Vessels
	Gross Tons	
Gyokuei Maru	10,357	28
Shikishima Maru	10,144	23
Aso Maru	3,500	1
Tenyo Maru	11,581	15
Soyo Maru	11,192	30
Einin Maru	7,482	15
Meisei Maru No. 2	9,300	8
Chichibu Maru	7,420	12
Hoyo Maru	14,111	30
Seifu Maru	8,269	28
Itsukushima Maru	5,871	18
Taiyo Maru No. 82	2,840	1
Kotoshiro Maru No. 15	700	3
Tone Maru	535	2

Japan (Contd.):

mission, 14 motherships and 214 catcher vessels will be authorized to engage in the Bering Sea bottomfish fishery. In 1964, 14 motherships and 228 catcher vessels were licensed to engage in that fishery. (Suisancho Nippo, January 20, 1965.)

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TRAWLER FLEETS DEPART FOR BERING SEA:

The Japanese shrimp factoryship Chichibu Maru (7,420 gross tons), accompanied by 9 trawlers, departed for the eastern Bering Sea from Hakodate on January 20, 1965. Three additional trawlers were expected to join the shrimp fleet later.

The 3,500-ton stern trawler Aso Maru, accompanied by one small trawler, was scheduled to depart Tokyo for the eastern Bering Sea on January 21. (Suisancho Nippo & Suisan Tsushin, January 20, 1965.)

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SEASONAL SAURY FISHERY DISAPPOINTING:

Japan's saury landings since the opening of the season in September through November 30, 1964, totaled only 206,600 metric tons, 110,600 tons below the saury landings for the same period in 1963. The saury catch off the coast of Hokkaido was particularly disappointing. Although the quantity of saury delivered to ports located on the Pacific side of Hokkaido were slightly above the previous year, landings from the Okhotsk coast of the Island dropped from 42,390 tons in 1963 to 2,900 tons in 1964. The failure of the run to appear off the Sanriku and Joban coasts of Honshu also was disappointing.

Because of the shortage of saury and prospects of poor fishing during December 1964, the price paid to the fishermen at landing ports during the month rose to 61 yen per kilogram (about 8 U.S. cents a pound) from an average price of about 29 yen (about 4 cents) during the previous three months. (Fisheries Attache, United States Embassy, Tokyo, December 24, 1964.)

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SAURY FISHERY TRENDS:

A survey of trends in the Japanese saury fishery shows that in 1964 a proportionately larger than usual amount of the catch was frozen as bait. This was attributed to the fact that the price of bait saury has tripled in one year. As a result, cold-storage operators are processing greater quantities of that species for bait and are planning to process sizes other than those considered to be of optimum bait size.

As of December 15, 1964, the total catch of saury was reported to be 209,600 metric tons, or slightly over 60 percent of the catch for the same period a year ago. Due to poor fishing conditions, fears were expressed earlier that there would be a severe shortage of bait saury in 1965. However, as a result of the above developments, as well as a plan being considered to encourage the wider use of other species (such as small mackerel and large sardines) for bait, the outlook for 1965 is considered much brighter. (Suisan Keizai Shimbun, December 20, 1964.)

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SALMON IMPORTS FROM COMMUNIST CHINA:

Japanese trading firms hope to import a fairly large quantity of chum salmon from Communist China in 1965. In 1964, two trading firms imported 20-30 metric tons of chum salmon at 230 yen a kilogram (US$0.28 a lb.), but the quality was poor. The trading firms hope to provide guidance in proper processing techniques (freezing and salting) this year before the commencement of the fishing season in China.

The chum salmon were reported to be from the Amur River. (Suisancho Nippo, January 19, 1965.)

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HERRING ROE ON KELP PROVE POPULAR:

A product of Alaska, "herring roe on kelp," exported to Japan, has become a highly popular food item in that country. Reportedly, demand is very strong and supplies can barely meet demand. As a result of the strong market a certain trading firm has made a request to the firm processing that product in Japan that it be appointed exclusive agent. Consideration is now being given to putting up a new style of consumer pack containing 120 grams (4.2 oz.) of "herring roe on kelp" which would be sold for 180 yen (US$0.50. (Suisancho Nippo, January 20, 1965.)

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Japan (Contd.):

HERRING TO BE IMPORTED FROM U.S.S.R.:

According to information released on January 8, 1965, by the Hokkaido Federation of Fishermen's Cooperative Associations (DOGYOREN), the Federation has concluded discussions with the Soviet Union to import 4,000 metric tons of Russian herring in 1965 at US$110 a metric ton for "fresh" herring and US$123 a ton for salted herring. In 1964, the Federation imported 3,000 tons of Russian herring at US$95 a ton for "fresh" and US$117 a ton for salted.

The trade agreement concluded by the Federation and the Soviet Government is subject to approval by the Japanese Government. Some sources believe that the Japanese Government may approve the importation of only 3,500 tons. (Suisan Keizai Shimbun, January 9, 1965.)

Note: Prices believed to be f.o.b.

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VIEWS ON SOVIET FISHING EXPANSION TO NEW FISHING GROUNDS:

According to the Japanese periodical Nihon Keizai, December 21, 1964, there is growing concern in Japanese fishing circles over possible competition with the Soviet fishing industry as a result of the recent appearance of Soviet fishing vessels off the Sanriku coast. As one of the top fisheries nations in the world, Japan has been almost free from pressure of foreign fishing operations on any fishing ground. The expansion of Soviet fishing operations is not overlooked by Japan, and in a few cases, the thinking is that the Japanese fishing industry is being surpassed by the Soviets.

Formerly, fishery problems between Japan and the Soviet Union have been limited to the salmon, salmon-trout, and crab fisheries in the Northwest Pacific. Those problems, such as catch quotas and regulations for fishing operations, have been under the jurisdiction of the Japan-Soviet Fisheries Commission. Now, the fishing vessels of Japan and the Soviet Union are in rivalry with each other on the following fishing grounds of the world: (1) The Soviet Union in 1964 sent a major fishing fleet to the grounds off Sanriku, which has been a mackerel-pike (saury) fishing ground exclusively for the Japanese, driving the Japanese fishing vessels into confusion by the misuse of SOS lines of communication; (2) Soviets also sent another large fishing fleet to the western coast of Africa where the Japanese are developing fishing grounds for cuttlefish, octopus, and sea bream. The Soviet Union has concluded "technical cooperation and aid agreements" with Ghana and other newly independent countries on the same coast, and is underselling its fishery products in those countries on the basis of "offering food to less developed countries" which is bringing about some market confusion; (3) Japan during 1964 sent only 6 trawlers to waters south of Alaska where it started its fishing activities in 1963 under the Japan-U.S.-Canada Fisheries Treaty. Japanese sources say that the Soviet Union has sent about 250 vessels to that same area.

The Japanese believe the Soviet Union has sent its mackerel-pike fishing fleet to the area off Sanriku, which borders on Japanese territorial waters, because the Soviets have started full-scale efforts for the development of northern Pacific fisheries by building in the spring of 1964 a cannery, which is said to be the biggest in the Far East, on the island of Shikotan. (The Soviet general headquarters for Far Eastern fisheries is in Vladivostok.) Japanese fisheries circles fear, above all, that the Soviet Union may advance into the field of "offshore" salmon and salmon-trout fisheries. At present, the Soviet Union is engaged in salmon and salmon-trout fisheries only at the estuaries of rivers or rivers on the sea coast, like the United States and Canada.

In recent years the Soviet Union has redoubled its efforts for the construction of refrigerator and canning factoryships. It has ordered such vessels from West Germany, and Japan[1/] while also building them at home. Despite the concern of Japanese fisheries circles, an agreement was concluded in spring 1964 between Japan and the Soviet Union for the export of cannery vessels with favorable payment terms to the Soviets calling for deferred payment of 70 percent over a period of 5½ years. Since then, most of the major Japanese industrial firms have concluded contracts with the Soviets. In 1964 alone, Soviet orders for about 200,000 gross tons of cannery and refrigerator vessels were received by Japanese firms. Although those vessels are likely to be used mainly for tuna fisheries, Japanese fisheries circles are uneasy because such vessels can also be used for fishing salm-

1/Editor's note: Also from Poland, East Germany, Finland, and Sweden.

Japan (Contd.):

on, salmon-trout and other fisheries. (Translation from Japanese periodical Nihon Keizai, United States Embassy, Tokyo, January 4, 1965.)

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JAPANESE PREPARING FOR NORTHWEST PACIFIC FISHERIES COMMISSION MEETING:

In preparation for the Ninth Annual Northwest Pacific Fisheries Commission (Japan-U.S.S.R.) Meeting scheduled to convene at Tokyo on March 1, 1965, the Japanese Fisheries Agency planned to meet with the Foreign Ministry to exchange views and to convene a series of meetings of high-level Agency personnel. Similarly, industry organizations involved in the North Pacific fisheries were said to be rushing preparations for the Annual Meeting. To seek an adjustment of views within the industry, the Japan Fisheries Society scheduled a meeting for January 19, 1965. (Suisan Keizai Shimbun, January 10, 1965.)

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GOVERNMENT MAY RATIFY TWO CONVENTIONS ON LAW OF THE SEA:

The Japanese Government is planning to participate in the Convention on the Territorial Sea and Contiguous Zone and the Convention on the High Seas (two of the four conventions on the Law of the Sea) to cope with the problems relating to territorial waters. The Japanese Government hopes to seek Diet consent on the ratification of those two conventions, possibly as early as 1965. In view of the recent trend towards extension of territorial waters by many countries, Japan considers it more realistic to revise her thinking on the traditional concept of the three-mile territorial sea limit in order to gain greater recognition of her established fishing rights in international waters. (Suisan Keizai Shimbun, December 18, 1964.)

Note: See Commercial Fisheries Review, October 1964 pp. 49 & 70.

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HIGH-SEAS FISHERY PROMOTION LAW PROPOSED:

The Japanese fishing industry has long felt the need for a law whereby the Government could assist the distant-water fisheries. Therefore, the industry plans to seek enactment of such legislation. Industry leaders, led by the officers of the Japan Fisheries Society and the President of a large fishery firm, are drafting a bill for the promotion of high-seas fisheries. The bill calls for the extension of government assistance to the distant-water fisheries, including the tuna, salmon, crab, bottom-trawl, and whale fisheries. The bill also spells out administrative measures on taxes, labor, and state subsidies. (Suisancho Nippo, January 14, 1965.)

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FISHING COMPANY OBTAINS LARGE LOAN:

Japan's largest fishing enterprise arranged to borrow US$21 million during 1965 from a United States financial institution. The loan bears an interest rate of 5.5 percent per annum. In 1964, that firm obtained a short-term loan of US$11.7 million from the same bank. (Japan Economic Journal, January 12, 1965.)

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FACTORYSHIP TO BUY POLLOCK FOR FISH MEAL FROM SOVIET FISHING VESSELS:

The Japanese factoryship Hoyo Maru (14,111 gross tons), formerly the Renshin Maru, was scheduled to depart Hakodate about January 25 for the Okhotsk Sea. Under an agreement concluded with the Soviet Union, the factoryship will buy from Soviet fishing vessels Alaska pollock for processing into meal. The agreement reportedly calls for the delivery of 30,000 metric tons of fish.

The Hoyo Maru was expected to remain on the fishing grounds for about 60 days, to the end of March 1965, and will initially operate in the vicinity of 52° N. latitude. Size of the Soviet fishing fleet that serviced the Japanese factoryship was not known, but Japanese sources believed that, on the basis of the quantity of fish contracted for delivery, about 30 vessels in the 150- to 300-ton class would be assigned to fish for the factoryship. (Suisan Keizai Shimbun, December 25, 1964, and January 9, 1965.)

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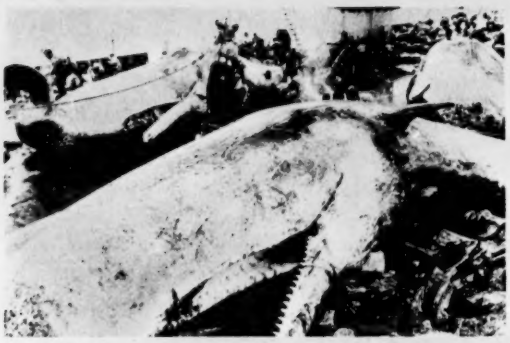
WHALE OIL AND MEAT PRODUCTION, 1963/64 SEASON:

Japan's production of whale products from the 1963/64 season's Antarctic and North Pacific whaling expeditions amounted to 334,905

Japan (Contd.):



Cutting up whales aboard a Japanese whaling factoryship.

Table 1 - Japanese Antarctic Production of Whale Products, 1963/64 Season

Product	Quantity	Estimated Value
	Metric Tons	US$1,000
Baleen (4,600 blue-whale units):		
Oil	95,400	21,111
Frozen meat	144,400	40,111
Salted meat	6,200	1,033
Meal	3,800	581
Liver oil	55	153
Whale meat extract	132	513
Total	249,987	63,502
Sperm (4,700 whales):		
Oil	1/20,400	4,122
Salted meat	1,600	267
Meal	1,400	214
Liver oil	45	125
Whale meat extract	158	614
Total	23,603	5,342
Grand total	273,590	68,844

1/Includes inventory carryover from previous season of 3,300 tons.

metric tons valued at an estimated US$83 million. The Antarctic operation produced 81 percent of the total quantity and 83 percent of the total value.

The major part of the 1963/64 season yield consisted of whale meat and oil. Those two products accounted for 329,200 metric tons

Table 2 - Japanese North Pacific Production of Whale Products, 1963/64 Season

Product	Quantity	Estimated Value
	Metric Tons	US$1,000
Baleen (800 blue-whale units):		
Oil	11,700	2,535
Frozen meat	25,800	7,167
Salted meat	300	50
Liver oil	26	72
Whale meat extract	13	58
Total	37,839	9,882
Sperm (2,460 whales):		
Oil	19,500	3,354
Frozen meat	2,100	350
Salted meat	1,800	300
Liver oil	45	125
Whole meat extract	31	138
Total	23,476	4,267
Grand total	61,315	14,149

or 98 percent of total production, of which whale meat totaled 182,200 tons and oil 147,000 tons. The value of those two items was $49.3 million and $31.1 million, respectively; they accounted for 59.3 percent and 37.5 percent of the total income received from the manufacture of whale products. (Fisheries Attache, United States Embassy, Tokyo, December 22, 1964.)

Note: See Commercial Fisheries Review, March 1964 p 61.

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GOVERNMENT'S FISHERY BUDGET ESTIMATES, FISCAL YEAR 1965:

The Japanese Government's fishery budget estimates for Fiscal Year 1965 (April 1965-March 1966) to be presented to the Diet for approval total 20,190 million yen (US$56.1 million), 9 percent more than the Fiscal Year 1964 budget of 18,600 million yen ($51.7 million). The Fiscal Year 1963 regular fishery budget was 15,166 million yen ($42.1 million). In line with the stringent fiscal policy laid down for 1965 by the Finance Ministry, very few new programs were added to the fishery budget as compared with previous years.

Funds for Some of the Proposed Fiscal Year 1965 Programs with Comparisons

Program	Proposed			
	FY 1965 Budget		FY 1964 Budget	
	Yen	US$	Yen	US$
	(In 1,000's)			
Water pollution control measures	1,612	4.5	-	-
Countermeasures for international fisheries	22,835	63.4	22,357	62.1
Guidance, supervision, and control of northern water fisheries	191,895	533.0	195,146	542.1
Guidance, supervision, and control of distant water fisheries	173,693	482.5	172,625	497.5
Promotion and development of overseas fisheries	24,373	67.7	4,624	12.8
Development of new fishing grounds	19,373	53.8	-	-
Improvement of fishing vessel management	11,120	30.9	9,946	27.6
Biological research related to international fisheries	148,458	412.4	137,756	382.7

Japan (Contd.):

The proposed fiscal year 1965 Japanese fishery budget includes the sum of $67,700 for the promotion and development of overseas fisheries, 5 times more than the previous year's allotment. It also includes $53,800 for a new program named "Development of New Fishing Grounds." Funds for the establishment of a fishery data center were disapproved by the Finance Ministry. (Suisan Keizai Shimbun, January 5, 1965.)

Netherlands

GOVERNMENT GIVES FISHING INDUSTRY FINANCIAL SUPPORT:

General details of the Netherlands Government budget of Fl. 2 million (US$554,000) for improvement of that country's fishing industry were announced by the Minister of Agriculture and Fisheries early in January 1965. Of the total, $277,000 is planned for the improvement in quality standards for fresh herring and mackerel; $125,000 for withdrawal of about 30 drift-net loggers from the fleet; $110,000 for support of experimental fishing trips; $28,000 for improving the fish canning industry; and $14,000 for rationalization of commercial fresh-water fishing in Friesland.

Quality Standards: A premium of Fl. 3 (85 U.S. cents) a case of 25 kilograms (55 pounds) will be paid for first-quality fresh herring and mackerel landed in unused barrels at IJmuiden and Scheveningen. The purpose of the premium is to improve the competitive position of Dutch herring and mackerel in the German market, particularly in competition with Danish fish.

Experimental Fishing Trips: Subsidies will be paid for fishing trips to nontraditional fishing grounds for catches of different species (particularly cod, haddock, and ocean perch as opposed to flat fish), and for use of new fishing methods and vessel types. The subsidy will be paid only if the "experiment" helps to improve the structure of the Dutch fishing industry; a special commission will make this determination. The subsidy is designed in part to entice Dutch fishermen away from the overfished North Sea grounds and to encourage diversification in the catch. It will compensate for any losses incurred in searching for new fishing grounds.

Vessel Replacement: During the 1964 season, 45 drift-net loggers were active, none of which was built later than 1930 and some of which are more than 60 years old. If at least 25 of those vessels are offered for replacement before April 1, 1965, a replacement subsidy of Fl. 15,000 ($4,150) per vessel will be paid. It was expected that about 30 of them would be offered.

Fish Canning: The subsidy will be used primarily to support the establishment of long-term delivery contracts to fish canneries. Steady supplies of fish to the canneries will, in the Government's opinion, result in more stable prices and better quality. The possibility of assistance in replacing machinery and equipment will also be investigated. It is hoped that the measures will assist in making Dutch canned fish more competitive in the European market.

Friesland Fresh-Water Fisheries: A fund will be established to buy up marginal commercial fresh-water fishing enterprises. The fund will be supplemented by the income earned from leasing the concessions held by such firms to sport fishermen.

With the exception of the Fl.50,000 ($14,000) earmarked for fresh-water fishing in Friesland, the subsidies will assist in improving the competitive position of the Dutch fishing industry in relation to its European Economic Community (EEC) counterparts, in anticipation of a common EEC fisheries policy. (United States Embassy, The Hague, January 7, 1965.)

Note: Fl. 3.614 equals US$1.00.

Norway

EXPORTS OF CANNED FISH, JANUARY 1-SEPTEMBER 26, 1964:

Norway's total exports of canned fish during January 1-September 26, 1964, were up about 6 percent from those in the same period of 1963, due mainly to larger shipments of canned brisling and canned soft herring roe.

The packing of sild sardines in 1964 started in early May and by October 17, 1964, a total of 459,848 standard cases of small sild was packed, compared with 500,009 standard cases in the same period of 1963. Most of that pack was smoked sild. Unsmoked sild

Norway (Contd.):

accounted for only 41,212 cases of the 1964 pack and 42,543 cases of the 1963 pack.

Norwegian Exports of Canned Fish

Product	Jan. 1- Sept. 26	
	1/1964	1963
	(Metric Tons)	
Brisling	4,956	3,782
Small sild	9,747	10,289
Kippered herring	2,450	2,318
Soft herring roe	1,073	621
Sild delicatessen	327	321
Shellfish	1,246	1,147
Other fishery products	2,282	2,410
Total	22,081	20,888

1/Preliminary.

The pack of brisling from the start of the season in late May to October 17, 1964, amounted to 362,081 standard cases, compared with 272,687 standard cases in the same period of 1963. The 1964 Norwegian brisling fishing season appeared to be drawing to a close in October 1964.

Mackerel landings in 1964 for canning purposes totaled 1,236 tons as of October 10, 1964, compared with 1,365 tons in the same period of 1963. (Norwegian Canners Export Journal, November 1964.)

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WHALE OIL STOCKS SOLD OUT:

Norwegian stocks of whale oil from the 1963/64 season production have been completely sold out, according to a report in the Norwegian newspaper, Norges Handels og Sjofartstidende, December 16, 1964. A total of 46,000 long tons of 1963/64 Norwegian whale oil production was sold at £83.5 (US$233.8) per long ton. The newspaper predicted an increase in the price of whale oil since Norwegian stocks are exhausted. Whale oil, unlike competing oils, does not deteriorate when stockpiled. (United States Embassy, Oslo, December 22, 1964.)

Pakistan

FISHERY PRODUCTS EXPORTS, FISCAL YEAR 1963/64:

Pakistan's export value of fishery products in fiscal year 1963/64 increased to about US$20.8 million as compared with $6.6 million in fiscal year 1958/59, according to a Pakistan Government press release. The value of exports for the current year is expected to be about the same as in the previous year. The export value of fishery products is expected to rise to $41.6 million by 1969/70, according to the estimate given in the outline of Pakistan's Third Five-Year Plan.

A modernized fishing vessel powered by a 30 b. hp. engine operating out of an East Pakistan port.

That country's total landings of fresh-water and marine fish in 1962/63 was 329,000 metric tons. The Third Five-Year Plan target is landings of 473,000 tons. If measures proposed to develop Pakistan's marine fishing industry are properly implemented it is estimated that about 25 percent of the target production will be exported. (United States Embassy, Karachi, January 1, 1965.)

Papua-New Guinea

FISHERIES POTENTIAL OF PAPUA AND NEW GUINEA:

The Australian-administered Territories of Papua and New Guinea are believed to have fishery resources which might support a canning industry. Those territories comprise the Australian Territory of Papua, and the United Nations Trust Territory of New Guinea which includes New Britain, New Ireland, Manus, Bougainville and Buka in the Solomons, and about 600 lesser islands. It is expected that a survey by the World Bank will recommend faster economic development for Papua and New Guinea. (Pacific Islands Monthly, November 1964.)

Persian Gulf

ANGLO-ARABIAN SHRIMP FISHING VENTURE IN PERSIAN GULF:

Since September 1964, a British firm has cooperated with interests in Beirut, Lebanon, to develop a shrimp fishing operation in the Persian Gulf.

The first trawler to be used in the new venture--a 95-foot (b.p.) side trawler with blast-freezing equipment purchased from Italian owners--has operated since late 1964. Results are promising.

A second vessel--a stern trawler purchased from Denmark--was sent to the Persian Gulf in early 1965 to expand the operation. The new stern trawler is larger than the first vessel and may serve as mothership to a number of small shrimp boats as well as engage in fishing itself.

The vessels will operate together and their catches--mainly shrimp--will be shipped to the United States on refrigerated freighters. (Ross Group, Grimsby, England, January 15, 1965.)

Note: See Commercial Fisheries Review, December 1964 p. 109.

Portugal

CANNED FISH EXPORTS, JANUARY-SEPTEMBER 1964:

Portugal's total exports of canned fish in oil or sauce during the first 9 months of 1964 showed only a small increase over the same period of 1963. Sardines accounted for 78 percent of the total canned fish exports in January-September 1964.

Portuguese Canned Fish Exports, January-September 1963-64

Product	Jan.-Sept. 1964		1963	
	Metric Tons	1,000 Cases	Metric Tons	1,000 Cases
In oil or sauce:				
Sardines	37,149	1,955	33,924	1,785
Chinchards	2,612	137	1,341	71
Mackerel	3,478	139	4,504	180
Tuna & tuna-like	1,444	48	2,590	86
Anchovy fillets	2,340	234	3,434	343
Others	529	27	258	14
Total	47,552	2,540	46,051	2,479

Portugal's principal canned fish buyers during the first 9 months of 1964 were Germany with 9,009 metric tons, the United Kingdom with 7,010 tons, Italy 4,873 tons, France 4,354 tons, the United States 4,195 tons, and Belgium-Luxembourg 2,980 tons. Germany's purchases of canned fish from Portugal in January-September 1964 increased 23 percent from those in the same period of 1963. Purchases by the United Kingdom were up 33 percent. But purchases by the United States and Italy in the first 9 months of 1964 were down 17 and 36 percent, respectively. (Conservas de Peixe, November 1964.)

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CANNED FISH PACK, JANUARY-SEPTEMBER 1964:

Portugal's total pack of canned fish in oil or sauce in the first 9 months of 1964 was up 28 percent from that in the same period in 1963. The increase was due to an expanded sardine pack. The pack of other leading Portuguese canned fish items was down in January-September 1964. (Conservas de Peixe, November 1964.)

Portuguese Canned Fish Pack, January-September 1963-64

Product	Jan.-Sept. 1964		1963	
	Metric Tons	1,000 Cases	Metric Tons	1,000 Cases
In oil or sauce:				
Sardines	34,177	1,799	19,818	1,043
Chinchards	1,356	71	2,315	123
Mackerel	3,375	135	5,414	216
Tuna & tunalike	4,708	157	5,381	180
Anchovy fillets	2,085	208	2,956	296
Others	534	28	347	18
Total	46,235	2,398	36,231	1,876

South Africa Republic

ANCHOVY AND PILCHARD FISHERIES, AUGUST SEPTEMBER 1964:

South Africa Republic: The new anchovy fishery of South Africa received its first large commercial test in August 1964 after the close of the Cape pilchard season. By the first week in September 1964, more than 40 Cape vessels were reported to be engaged in anchovy fishing. The Cape anchovy catch was 4,032 short tons in August 1964 and 21,342 tons in September 1964. Also taken in Cape anchovy nets during the 2 months was an incidental catch of 320 tons of pilchards and 116 tons of maasbanker. That brought the Cape shoal fish catch for January-September 1964 to 413,613 tons.

From the beginning of 1965, all vessels licensed to supply factories with pilchard, ma-

South Africa Republic (Contd.):

asbanker, and mackerel may also catch anchovy. That was announced by the Chairman of the South African Fisheries Development Corporation when he opened the Sea Harvest Festival at Lambert's Bay on October 31, 1964. He also stated that regulations for the anchovy fishery would be issued soon.

South-West Africa: Fishing vessels operating from Walvis Bay and Luderitz caught 108,965 tons of pilchards and 350 tons of anchovy during August 1964. In September 1964, as several factories closed down after completing their quotas, the catch dropped to 52,025 tons of pilchard and 176 tons of anchovy. At the end of September 1964, South-West African factories had received 661,047 tons of their 1964 quota of 720,000 tons.

At the end of September 1964, most factories in South-West Africa decided to postpone further anchovy fishing until the first part of 1965.

South and South-West Africa: Combined shoal fish catch for South Africa Republic and South-West Aftica January-September 1964 amounted to 1,074,210 tons of maasbanker, pilchard, mackerel, and anchovy.

By the end of October the 1964 shoal fish catch of South and South-West Africa had passed the 1963 record total of 1,085,806 short tons and seemed likely to reach 1,150,000 tons. When that is added to the eventual catch of the trawling section of the industry and of spiny lobster and line fish, it is almost certain to raise the 1964 total for all commercial fishing to a new record for the seventh year in succession since 1958. (South African Shipping News and Fishing Industry Review, November 1964.)

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SHRIMP EXPLORATIONS OFF COAST:

South Africa has moved another stage closer toward starting a shrimp fishing industry with the discovery in 1964 of apparently highly productive grounds to the west of Cape Agulhas and off Natal. The discoveries were made in the course of exploratory trips initiated and carried out by the Fisheries Development Corporation (FDC) in cooperation with the South African trawling industry.

Early in 1964 the small experimental stern trawler Keurbooms was made available to the FDC by a local fishing company. Using this 67-foot long vessel, an FDC crew under the direction of a former senior fishing technologist with the Division of Sea Fisheries, began a wide-ranging probe that extended from Lambert's Bay round to north of Durban.

According to the general manager of the FDC, the Keurbooms has proved very suitable for such explorations and could well indicate the type of vessel which may in the future be used in shrimp fishng. Although a beam trawl had been tested, almost all fishing has been done with 75- and 100-foot otter trawls whose synthetic fiber netting has a small mesh ranging in size from $1\frac{1}{2}$ inches stretched in the wings to $\frac{3}{4}$ inches stretched in the cod end.

The object of the explorations has been to investigate, try out, and pinpoint exploitable shrimp grounds. What has been achieved in a period of six months from February to August is described in a preliminary report issued in September 1964 by the FDC. The report notes that the investigation has led to the discovery of several shrimp grounds "which appear to be highly productive." The grounds are located off Durban (at depths between 200 and 230 fathoms), off the Tugela River mouth (at about 20 fathoms), and in the area between Cape Hangklip and Danger Point (at depths ranging from 85 to 90 fathoms).

Details given in the report of results from the five main areas covered are:

Area 1 (Lambert's Bay to Cape Point): The Keurbooms fished in those waters during February and March 1964, and achieved the best results between the latitudes of Saldanha Bay and Dassen Island. Catch details for the latter area are: gear used: 75-foot shrimp bottom trawl; depth range: 96-110 fathoms; total number of hauls: 32; total fishing time: 75 hours; total catch of shrimp: 205 pounds; best catch in a single haul: 16 pounds (in 2 hours); average catch an hour: 3 pounds; size of shrimp caught: 75-85 to the pound (heads on).

The species caught were Solenocera africanum (red prawn) and Chlorotocus crassiornus (red shrimp), and they were mixed mainly with large numbers of small hake. Fishing was done at night; a haul made during daytime yielded virtually no shrimp.

Area 2 (Cape Point to Cape Agulhas): This area fished during April to June revealed considerable concentrations of shrimp in two areas, namely from Cape Hangklip towards Gansbaai, and south of Danger Point as follows:

CAPE HANGKLIP TO GANSBAAI: Gear used: 75-foot shrimp bottom trawl; depth range: 85-86 fathoms;

South Africa Republic (Contd.):

total number of hauls: 7; total fishing: 7 hours; total catch of shrimp: 135 pounds; best catch in a single haul: 48 pounds (in 1 hour); average catch an hour: 20 pounds; size of shrimp: 120-130 to the pound.

SOUTH OF DANGER POINT: Gear used: 75-foot and 100-foot shrimp bottom trawls; depth range: 85-90 fathoms; total number of hauls: 16; total fishing time: 16 hours total catch of shrimp: 565 pounds; best catch in a single haul: 50 pounds (in 1 hour); average catch an hour: 35 pounds; size range of shrimp caught: 100-110 to the pound.

The predominant species of shrimp caught were Solenocera africanum, and catches contained fair quantities of small hake. As the few hauls made during daytime yielded negligible quantities of shrimp, night fishing was adapted as a standard procedure.

Area 3 (Cape Agulhas to Plettenberg Bay): This region was explored during April-June and yielded insignificant quantities of shrimp. The presence of large numbers of small Agulhas sole was a striking feature of the majority of the test catches made in the area.

Area 4 (Plettenberg Bay to Port Shepstone): This area explored intermittently during May and June, but bad weather hampered fishing, with the result that the catch data are rather sketchy. The isolated hauls made between Plettenberg Bay and Port Elizabeth yielded negligible amounts of shrimp, while the area extending from Port Elizabeth to Port Shepstone was not fished at all. Area 4 as a whole is rather poor in trawling grounds, but it is intended to investigate those grounds again when the opportunity arises.

Area 5 (Port Shepstone to Lourenco Marques): In that region, explored during July and early August, shrimp were found in abundance about 12 miles southeast of Durban and within 3 miles off the Tugela River mouth. The remainder of Area 5 yielded insignificant quantities of shrimp but this finding may be reversed by carrying out a more intensive survey, especially in the northern part of the area.

The catch details for the two productive grounds in Area 5 are as follows:

SOUTH-EAST OF DURBAN: Gear used: 100-foot shrimp bottom trawl; depth range: 200-230 fathoms; total number of hauls: 9; total fishing time: 9 hours; total catch of shrimp: 1,000 pounds; best catch in a single haul: 200 pounds (in 50 minutes); average catch an hour: 110 pounds. Size composition (by weight) of the average catch: "knife prawn" (about 25 a pound): 80 percent; "king prawn" (about 3 a pound): 16 percent; various small shrimp (about 150 a pound): 4 percent.

The two species of large shrimp caught (ranging from 3 to 25 to the pound) accounted for 96 percent of the catches. They were identified by the Division of Sea Fisheries as Hymenopenaeus triarthrus (knife prawn) and Nephrops andamanica (king prawn). The dominant species present among the small shrimp caught were Plesionika martia, Parapenaeopsis acclivirostria, and Solenocera comatum. The shrimp catches were often mixed with fair quantities of Natal spiny lobster. Catch results were equally good at night and during the day in the area.

OFF THE TUGELA RIVER MOUTH: Gear used: 75-foot and 100-foot shrimp bottom trawls; depth range: 14-21 fathoms; total number of hauls: 12; total fishing time: 12 hours; total catch of shrimp: 300 pounds; best catch in a single haul: 40 pounds (in 1 hour); average catch an hour: 25 pounds. Size composition (by weight) of the average catch: "brown shrimp" (about 15 a pound) and "tiger shrimp" (about 15 a pound) 73 percent; various small shrimp (about 150 a pound) 27 percent.

The Division of Sea Fisheries has identified the brown shrimp caught in the area as Penaeus indicus and the tiger shrimp as Penaeus monodon. They ran about 15 shrimp to the pound. The small shrimp caught were mainly of the same species as those found off Durban. The shrimp were mixed with fair quantities of small kob, and again there was no significant difference between catches made during daytime and those made at night.

The FDC report concluded that in view of the good results obtained, in particular off the Natal coast and on the western side of the Agulhas Bank, there seemed to be sufficient justification for intensifying explorations of the shrimp resources. The FDC intends to accelerate the survey in order to chart properly the boundaries of the fishing grounds and determine their seasonal yields, while at the same time trying to evolve the optimum fishing method and gear with an eye on commercial exploitation, but with due regard to the biological implications of fishing with small-mesh trawls. (The South African Shipping News and Fishing Industry Review, October 1964.)

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HARBORS BEING IMPROVED TO HELP FISHERIES EXPAND:

Harbor improvement is needed so that the fisheries of the South Africa Republic can expand. That was emphasized by the Chairman of the South African Fisheries Development Corporation when he opened the Sea Harvest Festival at Lambert's Bay on October 31, 1964.

Cape fishing vessels suffer serious inconvenience because of the crowded conditions at Table Bay Harbor. That affects fisheries expansion. Operators can't buy larger vessels until they are assured of adequate dock space. Development of a plan for harbor improvement at Table Bay is a priority project, according to the Chairman of the Fisheries Development Corporation. He said, however, that such work would be very expensive, and completion of a new fishing harbor at Table Bay could not be expected in less than 3 years.

The Chairman summarized plans for harbor improvement at other South African ports. He said work on the expansion of harbors at Hout Bay and Gansbaai would probably begin in 1965 and should be completed in 3 years. A portion of Saldanha Bay will be developed for the fishing industry. Government engineers proposed plans for improvements at St. Helena Bay,

South Africa Republic (Contd.):

where better shelter for fishing vessels is urgently needed. A special committee is studying the prospects for improving the facilities for fishing vessels and fish processing at Mossel Bay. Improvements at numerous other places along the long South African coastline were also considered. (South African Shipping News and Fishing Industry Review, November 1964.)

South-West Africa

NEW SPINY LOBSTER GROUNDS EXPLORED OFF COAST:

A group of Windhoek (South-West Africa) businessmen has been granted a concession by the South-West Africa Administration to carry out research work into the spiny lobster potential in the area south of Cape Cross (about 100 miles north of Walvis Bay) to a point just south of Walvis Bay.

The fishing vessel Dalkeith started exploratory work in November 1964 which was expected to take several months. It is understood that if the exploration proves successful the company will be granted a concession to catch and process spiny lobster from that area.

An area between the Hoanib and Kunene Rivers along the extreme north coast of South-West Africa also was visited by the manager of a Walvis Bay fishing firm and the Fisheries officer of the South-West African Administration to investigate possible spiny lobster fishing grounds. Indications there of a very rocky shoreline and discarded spiny lobster shells on the beach led to the belief that the area seemed very promising.

The Walvis Bay fishing firm has a concession to fish for spiny lobster along that stretch of the coast. (The South African Shipping News and Fishing Industry Review, November 1964.)

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NEW FISHING FIRM PLANS PURCHASE OF FREEZER-STERN TRAWLERS:

A new company is to be formed in South-West Africa to fish for whitefish or bottomfish in waters which have been worked almost exclusively by the Soviet fishing fleet.

The company plans to acquire three deep-sea freezer-stern trawlers which will be stationed at Walvis Bay. The share capital of the new company will be about US$415,000 with 200,000 shares to be made available to the public at 50 South African cents per share.

The trawlers were to be ordered as soon as legal formalities were completed and suitable land acquired at Walvis Bay for the erection of a factory. (The South African Shipping News and Fishing Industry Review, November 1964.)

Spain

FISHERY TRENDS AT VIGO, OCTOBER-DECEMBER 1964:

Landings and Prices: Fishery Landings at the port of Vigo, Spain, in October-December 1964 totaled 26,619 metric tons valued at 251.5 million pesetas (US$4.2 million), an increase of 14.0 percent in quantity but a decrease of 17.6 percent from the third quarter 1964 landings. Compared with October-December 1963, landings in the last quarter of 1964 were up 29.2 percent in quantity, but the value was down 6.3 percent.

Sardine landings were heavy during the last quarter of 1964--more than three times greater than in the last quarter of 1963. In October 1964, sardine landings for that month alone amounted to 7,000 tons. The lower value in the last quarter of the year was probably due to the larger proportion of lower-priced species in the total landings.

Total landings of 23,359 tons in July-September 1964 also included 2,548 tons of tuna (yellowfin), with an ex-vessel price of 27.18 pesetas a kilo (20.6 cents a pound).

Total landings in 1964 were lower by 8.1 percent in quantity and 20.8 percent in value

Spain (Contd.):

Table 1 - Landings and Average Ex-Vessel Prices of Selected Species at Vigo, October-December 1964 with Comparisons

Species	1964						1963		
	October-December			July-September			October-December		
	Quantity	Avg. Price		Quantity	Avg. Price		Quantity	Avg. Price	
	Metric Tons	Pesetas/Kilo	US¢/Lb.	Metric Tons	Pesetas/Kilo	US¢/Lb.	Metric Tons	Pesetas/Kilo	US¢/Lb.
Sardines . . .	10,442	5.27	4.0	2,021	6.61	5.0	3,359	8.09	6.1
Horse mackerel	3,239	5.03	3.8	4,806	2.21	1.7	3,034	4.14	3.1
Small hake . .	1,946	31.12	23.5	2,085	38.43	29.1	4,675	25.50	19.3
Octopus . . .	1,126	6.51	4.9	1,509	5.55	4.2	357	7.41	5.6

Table 2 - Distribution of Fishery Landings at Vigo, October-December 1964 with Comparisons

Period	Shipped Fresh to Domestic Markets	Canned	Other Distribution (Smoking, Drying, Fish Meal, etc.) and Local Consumption
	(Metric Tons)		
4th Quarter 1964	11,445	8,439	6,735
3rd Quarter 1964	10,884	6,140	6,335
4th Quarter 1963	12,020	5,364	3,215

as compared with 1963. Since 1963 was an all-time record year, the 1964 landings were considered to be very good.

Table 3 - Fishery Landings at Vigo, 1960-64

Year	Quantity	Value	
	Metric Tons	1,000 Pesetas	US$1,000
1964	84,425	999,673	16,667
1963	91,882	1,261,424	21,037
1962	79,344	890,449	14,850
1961	74,810	723,033	12,058
1960	65,457	660,645	11,018

During early 1965, a group representing Vigo fishery interests visited the United States to examine refrigerating machinery. The visit was believed to be in connection with plans to establish a fishing company with facilities to market frozen fish throughout Spain. If the program is carried out, it will be the second company of its type in Spain.

Canned Fish Industry: Mainly as a result of the abundance and low price of sardines in October 1964, the canning industry was more active than usual during the early part of the fourth quarter. This situation emphasized the need for greater cold-storage facilities. During the heavy landings in October, substantial quantities of sardines had to be used for fish meal and fertilizer, with considerable waste and loss in the value of the fish.

A slight uptrend in the quanity of canned fish exports was reported for the last quarter of 1964, with a considerable increase in exports of canned fish to the United States.

Note: See Commercial Fisheries Review, December 1964 p. 113; March 1964 p. 68.

U.S.S.R.

TUNA FACTORYSHIPS BUILT IN JAPAN:

The third of the five tuna factoryships ordered from Japan by the Soviet Union was scheduled to be turned over to the Soviet Union on January 19, 1965. Called the Iakie Luchi (5,100 gross tons), the factoryship carries 6 portable vessels and a complement of 180 persons. (Suisancho Nippo, January 12, 1965.)

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CANNED KING CRAB MEAT PRODUCTION FROM SEA OF OKHOTSK, 1958-64:

Production by the Soviet Union of canned king crab meat from the Sea of Okhotsk in 1964 was estimated to be 9.1 million pounds, according to a Japanese Government report. Average annual production from 1958 to 1964 was about 9.2 million pounds, but with a peak production of 14.2 million pounds in 1960.

Data on Soviet canned king crab production from the Sea of Okhotsk was reported to Japan as per the Japanese-Soviet fishery agreement

U.S.S.R. Canned King Crab Meat Production from Sea of Okhotsk, 1958-64

Year	Quantity
	Lbs.
1964	9,072,000
1963	8,731,200
1962	8,606,400
1961	7,790,400
1960	14,193,600
1959	7,795,200
1958	8,179,200

U.S.S.R. (Contd.):

under the Northwest Pacific Fisheries Convention between Japan and the U.S.S.R. (United States Embassy, Tokyo, January 12, 1965.)

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CANNED SALMON EXPORTS, 1963:

Soviet exports of canned salmon in 1963 totaled 188,300 cases, valued at 4,275,000 rubles (US$4.7 million), as compared to 194,100 cases valued at 5,206,000 rubles ($5.8 million) in 1962, according to data released by the Soviets.

Soviet Exports of Canned Salmon, 1962-63

Principal Countries of Destination	1963			1962		
	Qty.	Value		Qty.	Value	
	1,000 Cases	1,000 Rubles	US$ 1,000	1,000 Cases	1,000 Rubles	US$ 1,000
Great Britain	135.5	3,181	3,531	92.5	2,615	2,903
Cuba	12.1	229	254	29.5	711	789
Italy	7.7	171	190	2.5	48	53
Czechoslovakia	7.0	183	203	11.3	349	387
Belgium	5.9	101	112	5.2	92	102
East Germany	3.5	74	82	30.4	913	1,013
New Zealand	3.5	67	74	0.4	23	26
Australia	3.2	93	103	1.2	86	95
Finland	0.8	44	49	8.7	186	206

Note: New ruble (1964 official rate)--US$1.11.
Source: Suisancho Nippo, January 12, 1965.

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SALMON HYBRID ANNOUNCED BY SOVIETS:

The development of a new salmon hybrid has been announced by the Soviet Union. The salmon hybrid was developed on the Pacific Coast at the Kalinin fish-breeding plant on

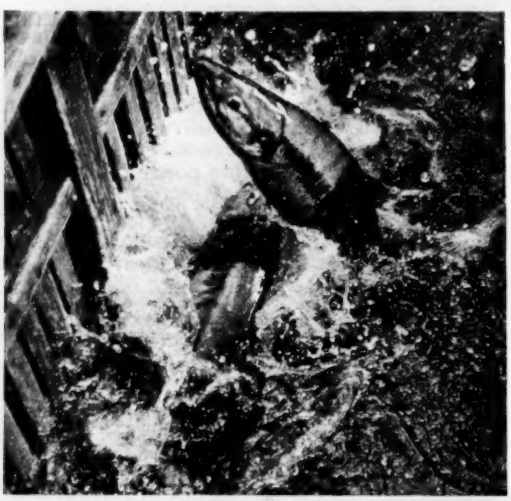

Fig. 1 - Salmon spawners migrating upstream are intercepted by trap at Kalinin fish-breeding plant.

Fig. 2 - Soviet hatchery workers at Kalinin fish-breeding plant remove salmon spawners from traps.

Fig. 3 - Soviet hatchery worker holds up salmon specimen taken from trap at Kalinin.

Sakhalin Island, according to the Soviet newspaper Tass. (Editor's Note: It is not clear what species of salmon were crossed to produce the hybrid. There are some indications

U.S.S.R. (Contd.):

that the cross involved chum and pink salmon, or salmon similar to those species.) The Soviets claim that the new hybrid salmon combines early maturity with good size. (The Fisherman, Vancouver, B.C., November 13, 1964.)

Note: See Commercial Fisheries Review, July 1964 p. 75, May 1964 p. 76.

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SOVIET TRAWLING ACTIVITIES OFF SOUTH AFRICA, OCTOBER 1964:

Summary: The following summary of Soviet trawling off the South Africa Republic appeared in the Walvis Bay (South-West Africa) Namib Times, October 9, 1964.

"The first Russian vessels appeared off South-West Africa in February 1961, and since then they have increased their fleet from 6 vessels to 26, of which some 23 are at present operating off the coast south of here. The fleet belongs to three Russian co-operatives--1 from the Baltic Ocean at Kaliningrad and 2 from the Black Sea (one at Odessa and the other at Poti).

They are catching mainly white fish (groundfish). The exact quantity they catch is not known, but it is estimated to be about 50,000 tons a year... .

"The Russians use far superior equipment... . Apart from the conventional echo-sounder they also have a horizontal scanner which can trace shoals of fish in an area of 3 to 4 miles round the vessel.

"The (Russian) trawlers have a freezing capacity for approximately 500 tons of fish which is transferred at sea (or in the bay here) to depot ships which ferry out provisions, oil, and water, and take the fish transferred from the trawlers back to Russia. Some of the fish is being sold to Ghana and the United Arab Republic.

"Calls at Walvis Bay are only to supplement oil, water, and provisions should a depot ship or tanker be late in arriving back in these waters with the main stores.

"A thorough and organized research program into the fish potential off this coast is being carried out at the same time.

"The (Russian) trawlers follow the fish between Luderitz and the Kunene River mouth. At this time of the year they usually go south of Walvis Bay."

Interview with Captain of Soviet Trawler: An interview with George Svanidze, Captain of the Soviet trawler Shota Rustavelli, was obtained by the editor of the Walvis Bay Namib Times. Following are excerpts from that interview as published in the Namib Times, October 9, 1964:

"Captain Svanidze said that he left his home port of Poti on the Black Sea on the 16th of February this year (1964). After experimental catches off Aden, down the east coast of Africa, off Madagascar, and the vicinity of Port Elizabeth he had finally reached Walvis Bay last month (September 1964) with 450 tons of fish... .

To sum up the interview, Captain Svanidze said "that fishing off this coast was poor at the moment; that he would barely make his 800 tons and therefore sacrifice the bonus they got if they brought home more than a 1,000 tons; that his ship could process a maximum of 15 to 20 tons of fish a day; that each trawler undertook one trip a year which usually lasted from 4 to 6 months...; and that he very much doubted that there were even 30 Russian ships operating off this coast."

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FREEZER-TRAWLER "GOLFSTRIM" DELIVERED TO SOVIETS BY DANISH SHIPYARD:

The 2,570-ton freezer-trawler M/S Golfstrim was delivered to V/O Sudoimport, Moscow, by a Copenhagen shipyard, December 30, 1964. Launched January 16, 1964, the vessel

Freezer-trawler M/S Golfstrim--a refrigerator vessel that can also be used as a trawler.

U.S.S.R. (Contd.):

is the 6th in a series of 11 freezer-trawlers for the U.S.S.R. being built by the Danish shipyard to the following specifications: length between perpendiculars 91 meters (298.5 feet), breadth 16 meters (52.5 feet), and deadweight tonnage 2,550 to 2,600 metric tons. The first vessel in the series was the M/S Skryplev launched May 10, 1962. Another series of 4 freezer-trawlers has been ordered by the Soviets from the Danish shipyard for delivery in 1966.

The M/S Golfstrim is powered by a 6-cylinder diesel engine developing 3,530 horsepower at 200 r.p.m. The vessel is designed to serve mainly as a refrigerator vessel, but it can also operate as a stern trawler. It is equipped with a large stern chute for trawling and also for hauling aboard catches of other vessels.

The propulsion machinery as well as the refrigerating plant of the vessel are located amidships, with large refrigerated cargo holds fore and aft. The entire superstructure is arranged amidships.

The rigging consists of two pairs of self-supporting derrick posts. The foremost pair is provided with a top mast, as well as a self-supporting combined signal and radar mast. The derricks (four 3-ton and two 7-ton) are served by four 3-ton and two 5-ton winches. The deck machinery also includes one anchor winch, two 3-ton warping winches, and one 15-ton trawl winch. All winches are electric-hydraulic. (Regional Fisheries Attache, United States Embassy, Copenhagen, January 6, 1965.)

Note: See Commercial Fisheries Review, March 1964 p. 70.

United Kingdom

NEW SEMIAUTOMATED STERN TRAWLER "ROSS DAINTY" LAUNCHED:

The Ross Dainty was launched January 19, 1965 at a shipyard in Selby, England. Scheduled for completion and delivery in April 1965, the vessel is the first of two additional "Daring" class semiautomated stern trawlers being built for a large British trawling firm.

Ross Daring and her sistership Ross Delight (both launched in 1963) pioneered semi-

Launching of the Ross Dainty.

automated stern trawling in the North Sea. Each of those vessels has a length overall of 99 feet, a range of about 30 days, and a fish-hold capacity for about 140,000 pounds of iced fish. Each is worked by a crew of five men including the skipper.

The Ross Dainty incorporates the basic design of the Ross Daring with improvements developed through extensive trials of the earlier vessel.

Note: See Commercial Fisheries Review, Dec. 1964 p. 115.

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BRITISH FIRM ORDERS TWO MORE SEMIAUTOMATED STERN TRAWLERS:

Sisterships to be named Ross Fame and Ross Fortune have been ordered from a shipyard in Selby, England, by the British firm which pioneered semiautomated trawling in the North Sea with the Ross Daring. Somewhat larger than Ross Daring, the new stern trawlers will extend automation to middle-distance fishing. Ross Fame and Ross Fortune will each operate with a 10-man crew. British middle-water vessels usually carry about 15 men. The new vessels will eventually have automatic gutting machines to handle their catch.

Specifications of the Ross Fame will be length between perpendiculars 120 feet, beam 30 feet, and molded depth 12½ feet. Fish-room capacity will be 8,500 cubic feet representing space for about 100 long tons of shelf fish. Power will be provided by an engine developing 950 b. hp. at 1,500 r.p.m.

Both Ross Fame and Ross Fortune will have a bridge in the true sense of the word,

United Kingdom (Contd.):

with a conventional winch well forward under the protection of the whaleback, hauling the gear under the bridge, a system adopted because of the size of the vessels. Covered gutting and washing rooms adjoining the bridge will receive the catch after it is sorted on deck.

When completed later this year, the new vessels will operate out of Grimsby.

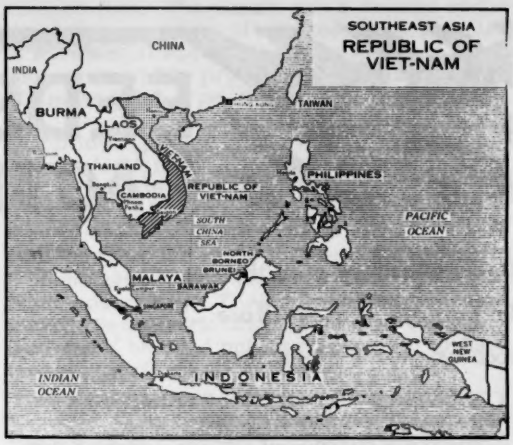
Note: See Commercial Fisheries Review, Dec. 1964 p. 115.

Viet-Nam

FISHERY TRENDS, JULY-SEPTEMBER 1964:

Viet-Nam's commercial fishery landings were at their highest level in August 1964 when they totaled 18,241 metric tons. But marine fish landings in September were light because of typhoons and strong seas.

Fishery exports, particularly of frozen shrimp, rose substantially throughout the third quarter of 1964, with 32,300 pounds in July, 59,000 pounds in August, and 92,000 pounds in September.



About 25 percent of Viet-Nam's fishing fleet of some 42,000 craft is now motorized, with the number of fishermen operating as of the end of 1964 jumping to about 205,000 from 187,000 at the end of 1963. (United States Embassy, Saigon, November 9, 1964.)

FAO ASKS TIGHT CONTROL OF PESTICIDES

As part of a general statement of policy concerning fish and pesticides (FAO Fisheries Technical Paper No. 45), the Food and Agriculture Organization of the United Nations recommended in part, that: "As a matter of general principle, all possible efforts should be made to ensure that in the use of pesticides either for agricultural purposes or public health purposes, there will be: (a) minimum loss to aquatic life; (b) minimum degradation of the aquatic environment with consequent loss or reduction of aquatic stocks; (c) minimum danger to human beings through the ingestion of fish or fish products containing pesticides."

Toward those ends, FAO said it would advise and promote close control of the manufacture, labeling, marketing, and application of pesticides. FAO will also recommend: (1) testing new pesticides for their effect on aquatic life; (2) using only those pesticides that dissipate quickly or break down in soils and do not have residual action; and (3) taking measures to retard the run-off of polluted soil into water courses. (SFI Bulletin, No. 159, February 1965.)

FEDERAL ACTIONS

Department of Health, Education, and Welfare

FOOD AND DRUG ADMINISTRATION

CONSUMER PROTECTION STRESSED AT ANNUAL CONFERENCE:

The main purpose of the 8th Annual Educational Conference, sponsored jointly by the U. S. Food and Drug Administration (FDA) and the Food Law Institute, was to promote understanding of and voluntary compliance with the Federal pure food and drug law. The Conference, held on November 30, 1964, at Washington, D. C., was highlighted by the theme, "What Industry Needs from FDA for Better Compliance."

In his paper, "Cooperation in Promoting Voluntary Compliance," FDA Commissioner George P. Larrick said, "The 1964 theme--industry information, voluntary compliance, consumer education--represents three interrelated ways of increasing consumer protection on a voluntary basis. The success of this approach depends upon constructive relationships between industry, consumers, and FDA, based upon a knowledge of each other's needs, functions, and responsibilities." He added that the FDA Consumer Education Program is based on the premise that an informed consumer can, among other things, appraise more accurately products that they buy, and that scientific research and communication are FDA's major tools in promoting voluntary compliance.

Other papers given at the Conference by FDA officials included, "Regulations, An Aid to Voluntary Compliance," "Science Promotes Voluntary Compliance," and "An Ounce of Prevention." The latter paper concluded with, ". . . .all of FDA's vast storehouse of information is available to all levels of consumers to enable them to buy and use foods, drugs, cosmetics, hazardous household substances, etc., safely and with confidence."

Note: See Commercial Fisheries Review, December 1964 p. 117.

Department of the Interior

NEW DIRECTOR AND DEPUTY DIRECTOR APPOINTED FOR BUREAU OF SPORT FISHERIES AND WILDLIFE:

John S. Gottschalk, a native of Indiana, was sworn in December 1, 1964, by Secretary of the Interior Stewart L. Udall as the new Director of the U. S. Bureau of Sport Fisheries and Wildlife.

Gottschalk succeeds Daniel H. Janzen, who has accepted an appointment to develop a program for preserving rare and endangered species of fish and wildlife.

N. O. Wood, Jr., Director of the Department of the Interior's Office of Management Operations, administering the oath of office to John S. Gottschalk, newly appointed Director of the Bureau of Sport Fisheries and Wildlife, as Secretary of the Interior Stewart L. Udall looks on. Congressman T. A. Thompson, Chairman of the Sub-Committee on Fisheries and Wildlife Conservation of the House Committee on Merchant Marine and Fisheries, is on the left.

The new director served as head of that Bureau's Region 5 office in Boston, Mass., from May 1959 until his new appointment. He joined the U. S. Fish and Wildlife Service in 1945 and has served in the Divisions of River Basin Studies and Federal Aid. He was also Chief of the Bureau's Division of Fisheries from November 1957 to May 1959.

Director Gottschalk was vice president of the Wildlife Society in 1955 and that year received an American Motors Conservation A-

ward--a national citation for outstanding service in conservation. He is immediate past president of the American Fisheries Society.

Abram V. Tunison, of Falls Church, Va., has been named deputy director of the U. S. Bureau of Sport Fisheries and Wildlife, the Department of the Interior announced January 12, 1965. He was formerly assistant director for Fisheries in that Bureau and later became associate director.

Tunison will share with Director John S. Gottschalk in developing and administering Federal programs to insure the conservation of the Nation's sport fish, wild birds, and mammals. Those programs encompass intensive research in fish and wildlife biology, including research in disease, parasites, nutrition, genetics, ecology, and pesticide-wildlife biochemistry. The bureau also operates a national system of fish hatcheries and wildlife refuges, acquires lands and water areas for waterfowl; administers cooperative programs for control of predatory animals and rodents to protect game, livestock, growing agricultural crops, range forage; and supervises grants-in-aid to States and Territories for wildlife and fisheries restoration.

Tunison received his bachelor of science and master's degrees at Cornell University where he majored in animal nutrition, and also studied for a doctoral degree. He is active in the American Fisheries Society, the American Society of Limnologists and Oceanographers, and the Wildlife Society.

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FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

CURRENT STATUS OF FISHERY RESOURCE DISASTER FUNDS:

To restore commercial fisheries in which there have been failures due to resource disasters arising from natural or undetermined causes, or to prevent similar failures in the future, $400,000 was authorized to be used by the Secretary of the Interior under Section 4 (b) of Public Law 88-309, the Commercial Fisheries Research and Development Act of 1964.

On July 25, 1964, the Secretary of the Interior determined that a commercial fishery failure due to a resource disaster had occurred in the Great Lakes chub industry. This failure occurred in 1963 following a Food and Drug Administration warning of botulism in smoked fish. The result was a drastic reduction in consumption of smoked fish. This led to substantial economic injury to Great Lakes fishermen and to processors and distributors of smoked fish from the Great Lakes area.

Following the Secretary's determination, Interior's Bureau of Commercial Fisheries met with state and industry representatives in the Great Lakes area. It was determined that diversion payments were necessary to remove from the usual markets the stocks of frozen chubs which were preventing normal trade operations. These chubs, even though frozen, had deteriorated to the point where they could be used only for reduction to fish meal or destroyed.

Letters of explanation and application forms were sent to 300 primary producers and processors of Great Lakes chubs throughout the United States. Eighty-five application forms were returned requesting diversion payments on about 1.7 million pounds of frozen chubs which were in storage prior to December 1, 1963, and which had not been sold or destroyed before May 20, 1964.

The responsibility for inspection and certification of stocks of chubs for diversion has been carried out under the general direction and supervision of the Regional Director, U. S. Bureau of Commercial Fisheries, Ann Arbor, Mich.

The first diversion payment was made on September 17, 1964, and by December 31, the termination date for the program, 51 inspection reports and claims for diversion payments had been received from smoked fish processors and producers in New York, Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Massachusetts, New Jersey, and California. Payments totaling $283,084.21 have been made for 1,621,874 pounds of chubs, which included 644,192 pounds of No. 1 (less than 320 fish per 100 pounds) and 977,682 pounds of No. 2 chubs (more than 320 fish per 100 pounds).

Prices paid to processors and primary producers were 21 cents and 7 cents per pound, respectively, for No. 1 and No. 2 fish. An additional 5 cents per pound was allowed in those instances where processing and related costs equalled or exceeded that amount.

Approximately 13 percent of the diverted chubs were destroyed and 87 percent were sold for reduction.

Section 4 (b) funds not used for diversion payments will be made available to Mid-western States under Section 253.4 (a) (4) of the regulations to carry out research and development projects directly related to the chub fishery. Project proposals received from the States of Minnesota, Wisconsin, and Michigan contemplate: (1) monitoring of smoked fish processing, distribution, and retailing; (2) educational activities involving sanitation practices, processing procedures, and handling techniques aimed at producing, processing, distribution, and retail levels; and (3) new product development.

Note: See Commercial Fisheries Review, December 1964 p. 117

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HEARINGS ON APPLICATIONS FOR FISHING VESSEL CONSTRUCTION DIFFERENTIAL SUBSIDY:

Ellingsen Fishing Corporation, Fairhaven, Mass., applied for a fishing vessel construction differential subsidy to aid in the construction of a 94-foot overall steel vessel to engage in the fishery for scallop, groundfish, flounder, lobster, and swordfish.

A hearing on the economic aspects of this application was scheduled for February 1, 1965, in Washington, D. C. The U. S. Bureau of Commercial Fisheries published the notice of hearing in the January 13, 1965, Federal Register.

Bethel, Inc., New Bedford, Mass., applied for a fishing vessel construction differential subsidy to aid in the construction of an 86-foot overall steel vessel to engage in the fishery for scallop, groundfish, lobster, and swordfish. A hearing on the economic aspects of the application was scheduled for February 19, 1965, in Washington, D. C.

Boat Commodore of N. B., Inc., New Bedford, Mass., applied for a fishing vessel construction differential subsidy to aid in the construction of an 86-foot overall wooden vessel to engage in the fishery for scallop, groundfish, flounder, and lobster. A hearing on the economic aspects of this application was scheduled for March 2, 1965, in Washington, D. C. Notice of hearings was published in the January 28, 1965, Federal Register for the two applications.

Einar Pedersen, Seattle, Wash., applied for a fishing vessel construction differential subsidy to aid in the construction of a 97-foot overall steel vessel to engage in the fisheries for halibut, king crab, bottomfish, sablefish, and albacore tuna. The vessel might fillet and freeze fish at sea. (Notice of hearing was first published in the January 28, 1965, Federal Register.)

The application was amended to extend the fisheries in which the vessel might engage to herring, Pacific hake, Pacific shrimp, and Pacific scallops. As a result of the amendment, the hearing on the economic aspects of the application was postponed from February 25 to March 9, 1965. (The change was published in the February 9, 1965 Federal Register.)

Interstate Commerce Commission

TRUCK DETENTION CHARGES IN MIDDLE ATLANTIC TERRITORY PROPOSED:

All common carriers operating within the Middle Atlantic territory and between that and the New England territory will have to charge for detention of trucks by shippers and consignees if a recommended report of an Examiner of the Interstate Commerce Commission (ICC) is adopted after a second hearing is held.

The Examiner's report is the result of an investigation in Docket 33434, "Detention of Motor Vehicles--Middle Atlantic and New England Territory." It stems from a petition filed by the Middle Atlantic Conference, composed of approximately 1,300 motor common carriers, which asked the ICC to institute the investigation. Exceptions have been taken to the Examiner's report and will probably require a decision of Division II of the ICC.

The Examiner modified the Commission's previous decision and added a requirement that carriers enter into "reasonable prearranged schedules" for loading and unloading whenever requested by a shipper or consignee.

If adopted the rule will apply in the Middle Atlantic territory (except New York short-haul territory), and between the Middle Atlantic and New England territories. The rule will not apply on household goods, commodities transported in bulk in tank trucks and in dump trucks, articles transported by heavy haulers or picked up from or delivered to railroad cars, or to the transportation of palletized shipments to the extent such shipments are subject to another rule.

The ICC Examiner said that the principle of the proposed detention rule "is to discourage delays to carriers' vehicles, and not as a source of revenue; that it is obviously fair that the additional expense to a carrier caused by unreasonable delays of its vehicles should be borne by those legally responsible therefor, rather than by allocation to all customers in the carrier's general rate structure; that, other things being equal, one 'carrier' cannot effectively carry out the provisions of a detention rule when another 'carrier' has a competitive advantage of no detention rule; and that there is little hope for stability without the prescription of a uniform detention rule."

The rule as proposed follows:

DETENTION OF VEHICLES

This rule applies when carriers' vehicles ("vehicles" as used in this rule means straight trucks or tractor-trailer combinations, except that this rule will not apply to trailers without power units left by carrier at place of pickup or delivery of consignor, consignee, or other party) are detained at the premises of consignor, consignee, or other places of pickup or delivery subject to the following provisions:

SECTION I--GENERAL PROVISIONS

(a) This rule applies only to vehicles which have been ordered or used to transport shipments subject to truckload rates. If the shipment is moving on a rate subject to a stated minimum weight of 12,000 pounds or more, and such rate is not designated as a truckload rate, it will be considered a truckload rate for the purpose of applying this rule.

(b) This rule applies only when vehicles are detained by consignor, consignee, or others at the places of pickup or delivery and not when detention is the fault of the carrier.

(c) Free time for each vehicle will be as provided in Section III.

(d) After the expiration of free time as herein provided, charges as provided in Section IV will apply.

SECTION II--COMPUTATION OF TIME

(a) The time per vehicle shall begin to run upon notification by the driver to the responsible representative of the consignor, consignee, or other party at the place of pickup or delivery of the arrival of the vehicle for loading or unloading, as the case may be, either on the premises of the consignor, consignee, or other party at the place of pickup or delivery or as close thereto as conditions on said premises (or under the control of the consignor, consignee, or other party at the place of pickup or delivery) will permit, and shall end upon completion of loading or unloading and receipt by the driver of a signed bill of lading or receipt for delivery, as the case may be, except as provided in paragraph (b) of this section. Time, if any, necessary to prepare a vehicle for loading or unloading, as the case may be, will be excluded from the computation of time.

Exception--When carrier and consignor, consignee, or other party at place of pickup or delivery make a prearranged schedule for arrival of the vehicle for loading or unloading and carrier is unable for any reason to maintain such schedule within 30 minutes, the time shall begin to run from the commencement of loading or unloading and not from the time of arrival of the vehicle. If carrier's vehicle arrives prior to scheduled time, the time shall begin to run from the scheduled time or actual time loading or unloading commences, whichever is earlier.

Upon request of consignor, consignee, or other party at place of pickup or delivery, carrier shall enter into a reasonable prearranged schedule for arrival of the vehicle for loading or unloading.

(b) Computations of time are subject to, and are to be made within the normal business (shipping or receiving) day of the consignor, consignee, or other party at the place of pickup or delivery. When loading or unloading is not completed at the end of such day, time will be resumed at the beginning of the next such day. When loading or unloading carries through a normal meal period, meal time, not to exceed one hour, will be excluded from computation of time.

SECTION III--FREE TIME

Free time shall be as follows:

Column A		Column B	
Actual Weight in Pounds per Vehicle	Free Time in Minutes	Actual Weight in Pounds per Vehicle Stop	Free Time in Minutes per Vehicle Stop
Less than 24,000	240	Less than 10,000	90
24,000 and less than 36,000 . .	300	10,000 and less than 20,000. .	180
36,000 or more	360	20,000 and less than 24,000. .	240
		24,000 and less than 36,000. .	300
		36,000 or more	360

Note: Column A - applies to vehicles containing truckload shipments requiring only one vehicle, or to fully loaded vehicles containing truckload shipments requiring more than one vehicle, except as provided in Column B.
Column B - applies to last vehicle used in transporting overflow truckload shipments requiring two or more vehicles, or to vehicles containing truckload shipments stopped for completion of loading or partial unloading.

SECTION IV--CHARGES

When the Delay per Vehicle Beyond Free Time is:	The Charge for Vehicle will be:
1 hour or less	$10.00
Over 1 hour but not over 75 minutes . . .	12.50
Over 75 minutes but not over 90 minutes .	15.00
Over 90 minutes but not over 105 minutes	17.50
Over 105 minutes but not over 120 minutes	20.00
Over 120 minutes but not over 135 minutes	22.50
Over 135 minutes but not over 150 minutes	25.00
Over 150 minutes but not over 165 minutes	27.50
Over 165 minutes but not over 180 minutes	30.00
Over 180 minutes	1/

1/$30.00 plus $2.50 per each 15 minutes or fraction thereof over 180 minutes.

SECTION V

A record of the following information must be maintained by the carriers and kept available at all times:

(a) Name and address of consignor, consignee, or other party at whose place of business freight is loaded or unloaded.

(b) Identification of vehicles tendered for loading or unloading.

(c) Date and time of notification of the arrival of the vehicle for loading or unloading.

(d) Date and time loading or unloading begins.

(e) Date and time loading or unloading is completed.

(f) Date and time vehicle is released for departure by consignor, consignee, or by other party at place of pickup or delivery after loading or unloading is completed.

(g) Total actual weight of shipment loaded or unloaded.

(h) Whether vehicles are tendered under a prearranged schedule for loading or unloading.

(i) When vehicles are tendered under a prearranged schedule for loading or unloading, date and time specified therefor.

SECTION VI

Nothing in this rule shall require a carrier to pick up or deliver freight at hours other than such carrier's normal business hours.

Department of Labor

WAGE AND HOUR AND PUBLIC CONTRACTS DIVISIONS

REVISED WAGE ORDER PROGRAM FOR INDUSTRIES IN PUERTO RICO, VIRGIN ISLANDS, AND AMERICAN SAMOA ANNOUNCED:

A revision of the 1965 wage order program under the Fair Labor Standards Act for industries in Puerto Rico, the Virgin Islands, and American Samoa was announced December 16, 1964, by the U. S. Labor Department's Wage and Hour and Public Contracts Divisions.

An industry committee (No. AS-6) hearing to be held in July 1965 will review all industries in American Samoa. Tuna canneries there will be included in the hearings since the minimum wage for tuna canneries in American Samoa is less than the mainland minimum wage. A committee hearing in November 1965 to consider all industries in the Virgin Islands was also added to the wage review schedule (Committee No. VI-9).

Food and related products in Puerto Rico does not include tuna canneries there because they are at present at the mainland minimum wage.

The Fair Labor Standards Act authorizes industry committees to recommend minimum wage rates for industries in Puerto Rico, the Virgin Islands, and American Samoa at or below the statutory minimums that apply on the mainland. Appointed by the Secretary of Labor, the committees are equally representative of employers, employees, and the public, and include residents of both the island involved and the mainland.

Eighty-Ninth Congress (First Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.

ANADROMOUS FISH CONSERVATION: Introduced in House: H. R. 2399 (Cohelan) Jan. 12, 1965, H. R. 2634 (Miller) Jan. 13, H. R. 3798 (Hague of Calif.) Jan. 28, H. R. 3927 (Dingell) Feb. 1, to authorize the Secretary of the Interior to inititate with several States a cooperative program for the conservation, development, and enhancement of the Nation's anadromous fish, and for other purposes; to the committee on Merchant Marine and Fisheries; similar to other bills. Also in Senate, similar to H. R. 2399, S. 909 (Magnuson) Feb. 1; to Committee on Commerce. Sen. Magnuson in his remarks (Congressional Record, Feb. 1, p. 1693) in the Senate pointed out that some of the principal anadromous species are Atlantic salmon, striped bass or rockfish, alewives, sturgeon, five species of Pacific salmon, steelhead, American shad, and "sea run trout." Would authorize Secretary of the Interior to first, conduct investigations, engineering, and biological surveys and research where necessary; second, construct, install, maintain, and operate devices and structures for the improvement of feeding and spawning conditions and for facilitating free migration of anadromous fish; third,

construct, operate, and maintain fish hatcheries; and fourth, purchase, lease, or accept donations of lands and any interest therein. Would authorize cooperative agreements with Federal, State, public, or private agencies, or organizations and colleges and universities to conduct studies, research, and investigation. Would appropriate $25 million for the 5-year life of the bill which would expire June 30, 1969. The Federal share, including the operation and maintenance of any facilities constructed, shall not exceed 50 percent of such costs exclusive of the value of any Federal land involved. Not to exceed 20 percent of all funds expended or obligated in any fiscal year may be expended in any one State. Would direct the Secretary of the Interior to make recommendations to the Secretary of Health, Education, and Welfare concerning the elimination or reduction of pollution when found to be detrimental to fish and wildlife in interstate waters or tributaries thereof. Also H. R. 4349 (Don H. Clausen) Feb. 4, similar to S. 909 except that Federal share shall not exceed 75 percent; would authorize $5 million annually with no expiration date.

BUDGET: The Budget of the United States Government, fiscal year ending June 30, 1966, 89th Congress, 1st Session, House Document No. 15, Part 1, 512 pp., printed. Contains Budget Message of the President, summary tables and statistical information, and various special analyses.

Appendix, the Budget of the United States Government, fiscal year ending June 30, 1966, 89th Congress, 1st Session, House Document No. 16, 1263 pp., printed. Shows the text of the appropriation estimates with specific reference materials on the various appropriations and funds.

COASTAL FISHERY RESOURCES OF U. S.: Sen. Magnuson inserted in the Congressional Record, Feb. 10, 1965 (pp. 2506-2509) the address Sen. Bartlett made Jan. 26, 1965, before the National Canners Association, San Francisco, titled "The Conservation of U. S. Coastal Fishery Resources." It emphasizes that the United States must take whatever action is required to conserve and protect the fishery resources upon which we depend.

COMMERCIAL FISHERY RESOURCES SURVEY: S. J. Res. 29 (Magnuson) introduced in Senate Jan. 19, 1965, joint resolution to authorize and direct the Bureau of Commercial Fisheries to conduct a survey of the marine and fresh-water commercial fishery resources of the United States, its territories, and possessions; to the Committee on Commerce. Sen. Magnuson's remarks (Congressional Record, Jan. 19, 1965, pp. 884-885) pointed out that it would authorize and direct the Bureau of Commercial Fisheries to conduct a survey of the character, extent and condition of the marine and fresh-water commercial fishery resources, both present and potential of the United States, its territories and possessions; the economic status and organization of the industry; the economic, legal and other institutional handicaps to industrial development and conservation of fishery resources; the effects thereon of existing conventions and treaties relating to the living marine resources of the high seas, and the nutritive and industry values of fishery products and byproducts affecting or potentially affecting the industry and its economy. (Similar to S. J. Res. 174 in 88th Congress, passed by Senate Aug. 19, 1964; referred to House Committee on Merchant Marine and Fisheries Aug. 20; no further action.)

EXPORT EXPANSION ACT OF 1965: S. 558 (Magnuson and 4 others) introduced in Senate Jan. 15, 1965, to Committee on Commerce; and H. R. 3028 (Adams) introduced in House Jan. 18, 1965, to Committee on Interstate and Foreign Commerce; to authorize the Secretary of Commerce to carry out certain programs to develop and expand foreign markets for U. S. products, and to provide more effectively for assistance in financing of certain foreign sales which are affected with national interest. Purpose is to step up U. S. exports by establishing an export financing fund to finance exports to countries with special credit risks. Sen. Magnuson's remarks (Congressional Record, Jan. 15, 1965, pp. 711-714) pointed out that Title I of his bill will create three separate but interrelated trade development programs: (1) A Trade Development Corps, (2) a program of cooperative industrial export development; and (3) a program of assistance in the establishment of sales and service centers in lesser developed countries. Rep. Adams' remarks (Congressional Record, Jan. 18, 1965, p. 791) pointed out that his bill provides guarantees so that American private capital can be used to finance our private industrial exports to the emerging nations. It also provides for a trade development corps, and improved system for using impacted currencies, and new U. S. sales and service centers throughout the world. Rep. Adams (Congressional Record, Jan. 19, 1965, p. 923) corrected his remarks of Jan. 18, 1965, in the permanent Record with a substitute for the text of H. R. 3028 (Adams) introduced Jan. 18.

FISHERIES LOAN FUND EXTENSION: House Jan. 28, 1965, and Senate Jan. 29, 1965, received a letter from the Assistant Secretary of the Interior, transmitting a draft of proposed legislation on extension of fisheries loan fund under the Fish and Wildlife Act of 1956; to Committee on Merchant Marine and Fisheries; and Committee on Interior and Insular Affairs, respectively.

H. R. 4227 (Bonner) introduced in House Feb. 3, 1965, to extend the term during which the Secretary of the Interior is authorized to make fisheries loans under the Fish and Wildlife Act of 1956, and for other purposes; to Committee on Merchant Marine and Fisheries. Would extend program from June 30, 1965, to June 30, 1975, and make certain technical changes; replace minimum annual interest rate with a formula for establishing the rate; provide annual payment to Treasury from fund of the interest on total loans outstanding at end of fiscal year.

Also S. 998 (Magnuson) introduced in Senate Feb. 4, 1965; to Committee on Commerce; similar to H. R. 4227. Sen. Magnuson in his remarks (Congressional Record, Feb. 4, 1965, pp. 1957-1958) inserted a letter from the Assistant Secretary of the Interior for Fish and Wildlife, requesting the proposed legislation, together with a statement relating to the bill. The letter pointed out that the objective of the program is to provide financial assistance to the commercial fishing industry for the purposes of upgrading or modernizing our fishing vessels and gear and thereby contributing to more efficient and profitable commercial fishing operations. The fund initially had an authorization of $10 million, but this was increased in 1958 to $20 million. A total of $13 million has actually been appropriated to the fund. However, the fund will expire on June 30, 1965, unless extended. Bill would extend the fund to June 30, 1975, and also make technical changes in section 4 of the 1956 Act to make the program conform to the guidelines adopted by the President on Federal credit programs.

FISHERMEN'S ORGANIZATION AND COLLECTIVE BARGAINING: H. R. 3955 (Pelly) introduced in House Feb. 1, 1965, and S. 1054 (Magnuson and Bartlett) introduced in Senate Feb. 9, 1965, to make clear that fish-

ermen's organizations, regardless of their technical legal status, have a voice in the ex-vessel sale of fish or other aquatic products on which the livelihood of their members depends; to Committee on Merchant Marine and Fisheries and Committee on Commerce, respectively. Sen. Magnuson in his remarks (Congressional Record, Feb. 9, 1965, p. 2257) pointed out that the bill is designed to establish a sound economic relationship between fishermen, vessel owners, fish dealers and canners and thereby further the development of the U. S. fishing industry and interest of the consumer. (Similar to bills in 88th Congress; no action except Senate subcommittee hearings in 1963.)

FISH HATCHERIES: H. R. 4229 (Carter) introduced in House Feb. 3, 1965; Feb. 10: H. R. 4773 (Farnsley), H. R. 4811 (Stubblefield); to provide for the establishment of a new fish hatchery below but as near the Wolf Creek Dam, on the Cumberland River, near Jamestown, Ky., as is feasible and practicable; to Committee on Merchant Marine and Fisheries.

FISHING INDUSTRY: Senator Bartlett Jan. 29, 1965, had printed in the Congressional Record (pp. 1531-1532) the address ("The American Fishing Industry, 1964") by Donald L. McKernan, Director of the Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, at the 58th Annual Convention (Jan. 1965) of the National Canners Association in San Francisco. The address summarizes the present status of the U. S. fishing industry.

FOOD MARKETING NATIONAL COMMISSION: Pursuant to the provisions of section 2, Public Law 88-354, the Speaker of the House announced that he had appointed Representatives Sullivan (Mo.), Purcell (Tex.), Rosenthal (N. Y.), Cunningham (Nebr.), May (Wash.) on the part of the House to membership on the National Commission on Food Marketing. Established to study and appraise the marketing structure of the food industry, the Commission is composed of 15 members--5 from the Senate, 5 from the House, and 5 appointed by the President from outside the Federal Government.

FOREIGN VESSELS' PROCESSING OF FISHERY PRODUCTS IN U. S. TERRITORIAL WATERS BANNED: H. R. 3954 (Pelly) introduced in House Feb. 1, 1965, to amend the act prohibiting fishing in the territorial waters of the United States by vessels other than vessels of the United States in order to expand the definition of the term "fisheries"; to Committee on Merchant Marine and Fisheries. Would prohibit freezing, packing, or other processing of fish or shellfish by foreign vessels in the territorial waters of the United States. (Similar to other bills in 88th Congress, no action.)

HALIBUT FISHING: Rep. Pelly in his extension of remarks (Congressional Record, Feb. 8, 1965, p. A509) inserted excerpts from a letter he received from the Secretary-Treasurer of the Deep Sea Fishermen's Union of the Pacific expressing the views of its membership in regard to the U. S. position on halibut fisheries in the north Pacific Ocean.

IMPORT COMPETITION ADJUSTMENT: H. R. 655 (Pucinski) introduced in House Jan. 4, 1965, to provide for adjusting conditions of competition between certain domestic industries and foreign industries with respect to the level of wages and the working conditions in the production of articles imported into the United States; to Committee on Ways and Means. (Similar to H. R. 1139, in 88th Congress; no action.)

INTERIOR DEPARTMENT: Assistant Secretary for Fish and Wildlife: Senator Metcalf in the Senate on Jan. 12, 1965, paid tribute to Frank P. Briggs, who is retiring as Assistant Secretary of Interior for Fish and Wildlife; that day's Congressional Record (p. 548).

Under Secretary: On Jan. 12, 1965, the Senate Committee on Interior and Insular Affairs favorably reported the nomination of John A. Carver, Jr., of Idaho, to be Under Secretary of the Interior. Prior to that action, the nominee testified and answered questions in his own behalf. On Jan. 15, Senate confirmed the nomination.

Interior Nomination: Hearing before the Committee on Interior and Insular Affairs, United States Senate, 89th Congress, 1st Session, on the nomination of John A. Carver, Jr., of Idaho, to be Under Secretary of the Interior, Jan. 12, 1965, 24 pp., printed. Includes a statement from the nominee, statements of several Senators, biological sketch, and pertinent editorials from several newspapers.

INTERIOR DEPARTMENT APPROPRIATIONS, FY 1966: Appropriations for the Department of the Interior and related agencies for fiscal year 1965 as contained in the President's Budget submission to Congress. Includes funds for the Fish and Wildlife Service and its two bureaus--Bureau of Commercial Fisheries and Bureau of Sport Fisheries and Wildlife. The Bureau of Commercial Fisheries is proposed for $30,597,000, an increase over the previous year. Of interest is a $2 million request for a new program: "Federal Aid for Commercial Fisheries Research and Development," authorized by a new Act. Those funds will be apportioned among the states, Puerto Rico, American Samoa, the Virgin Islands, and Guam on a matching basis of up to 75 percent Federal funding.

Fish and Wildlife Service Annual Appropriations for Fiscal Year 1965 and for Fiscal Year 1966

Item	1965 Adjusted Appropriation	Fiscal Year 1966 Est.
	. . . ($1,000) . . .	
FISH AND WILDLIFE SERVICE:		
OFFICE OF THE COMMISSIONER:		
Salaries and Expenses	$ 444	$ 444
BUREAU OF COMMERCIAL FISHERIES:		
Mgt. & invest. of resources	21,227	21,218
(Foreign Currency Program)	300	300
Construction	4,938	1,405
Construction of fishing vessels	2,500	5,000
General administrative expenses	704	674
Fed. aid for comm. fish research and develop.	-	2,000
Total Bureau of Commercial Fisheries	29,669	30,597
BUREAU OF SPORT FISHERIES & WILDLIFE:		
Total	52,809	46,885

Note: Permanent appropriations and special funds not included.

House Speaker Feb. 9, 1965, presented a memorial of the Legislature of the State of Washington memorializing the President and the Congress of the United States to consider legislations for restoration of funds in the Department of the Interior's budget for the Columbia River Fishery Development program; referred to Committee on Appropriations.

INTERNATIONAL FISHERY PROBLEMS: Senator Bartlett Jan. 28, 1965, had printed in the Congressional

Record (pp. 1461-1463) the address ("Some U. S. International Fishery Problems and International Rules Dealing with Fisheries") by William C. Herrington, Special Assistant for Fisheries and Wildlife, at the 58th Annual (Jan. 26, 1965) Convention of the National Canners Association in San Francisco. The address presents different aspects of U. S. involvement in the international fisheries.

MARINE EXPLORATION AND DEVELOPMENT ACT: S. 1091 (Bartlett and 4 others) introduced in Senate Feb. 10, 1965, to provide a program of marine exploration and development of the resources of the Continental Shelf; to Committee on Commerce. Sen. Bartlett in his remarks (Congressional Record, Feb. 10, 1965, pp. 2477-2479) pointed out that this bill would establish and announce U. S. policy to undertake and accelerate a program of exploration and economic development of the physical, chemical, geological, and biological resources of the Continental Shelf. For executing this program the legislation would establish a Marine Exploration and Development Commission composed of five members--two members to be appointed by the President from private life, the Secretary of Commerce, Secretary of the Interior, and Secretary of Defense. The first function of the Commission would be to formulate and execute a program of exploration and development of marine resources of the Continental Shelf. More specifically, this would include the identification, location and economic development of mineral and biological resources of the Continental Shelf, the development of an engineering capability that will permit the exploration and development of these resources and the encouragement of marine exploration and development by scientific institutions and industries through the use of grants, loans and other cost-sharing arrangements. A marine exploration and development fund would be established. In addition to that fund, the legislation authorizes an annual appropriation not to exceed $50 million to enable the Commission to carry out its own programing and operational functions under the act. This proposed legislation is directed at the development of all resources on and above the Continental Shelf, including fishery resources.

METRIC SYSTEM STUDY: H. R. 1154 (Roosevelt) introduced in House Jan. 4, 1965, to provide that the Secretary of Commerce shall conduct a study to determine the practicability and desirability of the adoption by the United States of the metric system of weights and measures; to Committee on Science and Astronautics. Similar to H. R. 301. Also similar bill S. 774 (Pell) introduced Jan. 27 in Senate; to Committee on Commerce.

MINIMUM WAGE: H. R. 1022 (Gilbert) and H. R. 1150 (Roosevelt) introduced in House Jan. 4, 1965, to amend the Fair Labor Standards Act of 1938 to increase the minimum wage to $2 an hour; to Committee on Education and Labor. These bills are similar except that H. R. 1150 provides increases in steps from $1.50 during the first year, $1.75 during the second year, and $2.00 thereafter with certain special provisions for Puerto Rico, Virgin Islands, and American Samoa.

NATIONAL FISHERIES CENTER AND AQUARIUM ADVISORY BOARD: Pursuant to the provisions of section 5(a), Public Law 87-758, the Speaker of the House appointed Representatives Kirwan (Ohio) and Edwards (Ala.) to membership on the National Fisheries Center and Aquarium Advisory Board.

OCEANOGRAPHY: Introduced in House Jan. 11, 1965, H. R. 2218 (Lennon), Jan. 21 H. R. 3310 (Pelly), Jan. 25 H. R. 3352 (Bonner), to provide for a comprehensive, long-range, and coordinated national program in oceanography, and for other purposes; to Committee on Merchant Marine and Fisheries. (Similar to other bills in 88th Congress, especially H. R. 6997 passed by House Aug. 5, 1963, and referred to Senate Committee on Commerce Aug. 6, 1963; no further action.)

Hon. Santiago Polanco-Abreu, Resident Commissioner from Puerto Rico, in extension of remarks (Congressional Record, Jan. 28, 1965, pp. A352-353) stated that the ocean survey ship Explorer of the Coast and Geodetic Survey, U. S. Department of Commerce, was to sail Feb. 2, 1965, to conduct extensive hydrographic and oceanographic surveys in the Caribbean on a voyage which is expected to last for 4 months. Included is a description of the Explorer's mission.

OCEANOGRAPHIC COUNCIL: S. 944 (Magnuson and 12 others) introduced in Senate Feb. 2, 1965, to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes; to Committee on Commerce. Sen. Magnuson in his remarks (Congressional Record, Feb. 2, 1965, pp. 1754-1757) pointed out that the bill had two major legislative objectives. One is to set forth a policy and purpose for our national oceanographic program. The other is to provide high level guidance and coordination of Government activities under this program.

OCEANOGRAPHIC RESEARCH VESSEL INSPECTION: S. 627 (Magnuson) introduced in Senate Jan. 19, 1965, to exempt oceanographic research vessels from the application of certain vessel inspection laws, and for other purposes; to the Committee on Commerce. Also H. R. 3419 (Hanna) introduced in House Jan. 25, 1965; to Committee on Merchant Marine and Fisheries. Senator Magnuson's remarks (Congressional Record, Jan. 19, 1965, pp. 883-884) pointed out that the purpose of the proposed legislation is to encourage and facilitate oceanographic research by removing certain impediments which have been handicapping research vessel operation by both oceanographic institutions and private industry. (Similar to S. 2552 in 88th Congress; passed by Senate Aug. 1, 1964; referred to House Committee on Merchant Marine and Fisheries Aug. 3; no further action.)

OUTER CONTINENTAL SHELF RESTRICTED AREAS: Senate Jan. 12, 1965, received letter from the Secretary of the Navy, transmitting a draft of proposed legislation to provide for the restriction of certain areas in the Outer Continental Shelf, known as the Corpus Christi offshore warning area, for defense purposes, and for other purposes (with accompanying papers); to the Committee on Interior and Insular Affairs.

Introduced in Senate, Jan. 12, 1965, certain bills to provide for the restriction of certain areas in the Outer Shelf for defense purposes: (1) S. 426 the Eastern Test Range, (2) S. 427 Gulf Test Range, Gulf of Mexico, (3) S. 428 Matagorda Water Range; and for other purposes (with accompanying papers); to the Committee on Interior and Insular Affairs. Sen. Jackson in his remarks in that day's Congressional Record (p. 515) on the bills said, in part, that each provides for the restriction of certain areas of the submerged lands of the Outer Continental Shelf off the coasts of Florida and Texas for Defense Department and National Aeronautics and Space Administration purposes.

S. 645 (Jackson) introduced in Senate Jan. 22, 1965, to provide for the restriction of certain areas in the Outer Continental Shelf, known as the Corpus Christi off-

shore warning area, for defense purposes, and for other purposes; to Committee on Interior and Insular Affairs. Rep. Jackson's remarks (Congressional Record, p. 1003) pointed out that it would restrict the use of certain lands and waters (some 3.8 million acres) of the Outer Continental Shelf adjacent to the State of Texas and the operation of mineral leasing laws therein. Use by the Naval Air Advanced Training Command at Corpus Christi will be about 80 percent of the available daylight hours for the foreseeable future. Also introduced in House H. R. 2261 (Aspinall) Jan. 11, 1965, to provide for the Eastern Test Range; H. R. 2659 Jan. 13, 1965, to provide for the Gulf Test Range, Gulf of Mexico; both to Committee on Interior and Insular Affairs; similar to other Senate bills.

S. 999 (Jackson) introduced in Senate Feb. 4, 1965, to amend the act of Feb. 28, 1958, relating to the withdrawal, reservation, or restriction of public lands, and for other purposes; to Committee on Interior and Insular Affairs. Sen. Jackson in his remarks (Congressional Record, Feb. 4, 1965, pp. 1958-1959) inserted text of the bill and accompanying letter from the General Counsel of the Department of Defense. The letter stated the bill would, with respect to the most urgently needed shelf areas, replace the existing requirement for an act of Congress with a procedure under which the Committees on Interior and Insular Affairs would be notified in advance of any proposed restriction. But the present proposal would continue to make applicable the requirement for enabling legislation to shelf areas which are to be used for bombing, missile launching, or other activities which might make the areas unsafe for nonmilitary use.

PACIFIC SOUTHWEST WATER RESOURCES: Introduced in House Jan. 11, 1965: H. R. 2264 (Hosmer); Jan. 13, H. R. 2618 (Lipscomb), H. R. 2661 (Teague of Calif., H. R. 2663 (Wilson); Jan. 6, H. R. 1740 (Teague of Calif.); Jan. 19, H. R. 3176 (Smith of Calif.); to authorize the coordinated development of the water resources of the Pacific Southwest, and for other purposes; to the Committee on Interior and Insular Affairs.

PASSAMAQUODDY TIDAL POWER PROJECT: H. R. 2615 (Hathaway) and H. R. 2662 (Tupper) introduced in House Jan. 13, 1965, to Committee on Foreign Affairs; and S. 515 (Muskie and 7 others) introduced in Senate Jan. 15, 1965, to Committee on Public Works; to authorize the international Passamaquoddy tidal power project, including hydroelectric power development of the upper St. John River, and for other purposes. Congressman Hathaway's remarks (Congressional Record, Jan. 13, 1965, p. 626) pointed out that this project would harness the tides of Passamaquoddy and Cobscook Bays in Maine and New Brunswick and would develop the resources of the upper St. John River to the advantage of Maine, New England, and the Maritime Provinces of Canada. (These bills are similar to H. R. 10179 and other bills in 88th Congress; no action.)

PESTICIDES AND FISH AND WILDLIFE: H. R. 4157 (Dingell) introduced in House Feb. 2, 1965, to amend the act of August 1, 1958, in order to prevent or minimize injury to fish and wildlife from the use of insecticides, herbicides, fungicides, and pesticides; to Committee on Merchant Marine and Fisheries.

H. R. 4158 (Dingell) introduced in House Feb. 2, 1965, to provide for advance consultation with the Fish and Wildlife Service and with state wildlife agencies before the beginning of any Federal program involving the use of pesticides or other chemicals designed for mass biological controls; to Committee on Merchant Marine and Fisheries.

PESTICIDE RESEARCH: S. 1085 (Mrs. Neuberger) introduced in Senate Feb. 10, 1965, to amend the act of Aug. 1, 1958, as amended, to increase the authorization for pesticide research by the Secretary of the Interior; to Committee on Commerce. Increase would be to $3.2 million for fiscal year 1966 and $5 million annually thereafter.

PORT ORFORD, OREGON NAVIGATION PROJECT: S. 467 (Morse and Neuberger) introduced in Senate Jan. 12, 1965, and H. R. 2413 (Duncan of Oregon) introduced in House Jan. 12, 1965, to authorize construction of a navigation project at Port Orford, Oregon, referred to the respective Committees on Public Works. Congressional Record of Jan. 12 contains remarks of Senator Morse on the bill (p. 510) and remarks of Representative Duncan (p. 588) who points out, in part, that in addition to other benefits, this bill will "permit safe moorage of fishing boats and other small craft."

RESOURCES AND CONSERVATION ACT: S. 938 (McGovern and 15 others) introduced in Senate Feb. 1, 1965, H. R. 4430 (Ullman) introduced in House Feb. 4, 1965, to declare a national policy on conservation, development, and utilization of natural resources, and for other purposes; to Senate and House Committee on Interior and Insular Affairs, respectively. Would establish a Council of Resource and Conservation Advisors to review the availability and requirements of natural resources, formulate programs and policies, and report annually to the President. Would provide for special committees in the Senate and House of Representatives to deal with resources and conservation.

SCHOOL LUNCH ACT AMENDMENT: H. R. 3987 (Berry) introduced in House Feb. 1, 1965, to amend the National School Lunch Act in order to extend the provisions of that act to institutions of higher education; to Committee on Education and Labor.

SHRIMP IMPORTS: H. R. 2403 (Colmer) introduced in House, Jan. 12, 1965, to provide for an ad valorem duty on the importation of shrimp; to the Committee on Ways and Means. Would impose a 35 percent duty on imported shrimp. (This bill similar to H. R. 822 and H. R. 1774, 88th Congress, on which no action was taken.)

SMALL BUSINESS DISASTER LOANS: H. R. 2860 (Widnall) and H. R. 2861 (Wyatt) introduced in House Jan. 14, 1965, to amend the Small Business Act to authorize additional funds to be available exclusively for disaster loans; to the Committee on Banking and Currency. (Seems to be similar to P. L. 88-264 enacted by the 88th Congress and signed by the President Feb. 5, 1964.)

SUBMERGED LANDS ACT: Introduced in House Jan. 12, 1965, H. R. 2373 (Boggs), and Jan 13, 1965: H. R. 2664 (Herbert), H. R. 2665 (Long of Louisiana), H. R. 2666 (Morrison), H. R. 2667 (Passman), H. R. 2668 (Thompson of Louisiana), H. R. 2689 (Waggonner), and H. R. 2670 (Willis), to amend the Submerged Lands Act to establish the seaward boundaries of the States of Alabama, Mississippi, and Louisiana as extending 3 marine leagues into the Gulf of Mexico and providing for the ownership and use of the submerged lands, improvements, minerals, and natural resources within the boundaries; to the Committee on the Judiciary. (Similar to H. R. 116 and other bills in 88th Congress; no action.)

SUSQUEHANNA RIVER BASIN: H. J. Res. 205 (Flood) introduced in House Jan. 18, 1965, to create a regional agency by intergovernmental compact for the planning, conservation, utilization, development, management, and control of the water and related natural resources of the Susquehanna River Basin, for the improvement of navigation, reduction of flood damage, reduction and control of surface subsidence, regulation of water quality, control of pollution, development of water supply, hydroelectric energy, fish and wildlife habitat, and public recreational facilities, and other purposes, and defining the functions, powers, and duties of such agency; to the Committee on the Judiciary.

TRADE AGREEMENT PROGRAM: Senate Feb. 9, 1965, received a letter from the Chairman, U. S. Tariff Commission, Washington, D. C., transmitting pursuant to law, a report on the operation of the trade agreements program, for the period July 1962-June 1963 (with accompanying report); to Committee on Finance.

TRADE COUNCIL: S. J. Res. 36 (Magnuson) introduced in Senate, to develop proposals for the expansion of trade by the establishment of a high-level advisory council; to the Committee on Commerce. Sen. Magnuson in his remarks (Congressional Record, pp. 1711-1712) in the Senate pointed out that the council would advise Congress and the President of the extent to which, and the methods by which, trade in nonstrategic goods and services between the United States and countries within the Communist bloc can profitably be expanded.

TRADE EXPANSION ACT AMENDMENT: Introduced in House: Jan. 4, 1965 H. R. 916 (Whitener) and H. R. 1166 (Secrest), Jan. 5 H. R. 1532 (Dague), Jan. 6 H. R. 1655 (Bow), Jan. 7 H. R. 2096 (Whalley), Jan. 14 H. R. 2843 (Monagan), to amend the Trade Expansion Act of 1962; to the Committee on Ways and Means. Would, in addition to other imported articles described in the Act of 1962, reserve certain imported articles that produce or tend to produce a combined competitive impact upon the like or directly competitive domestic articles or closely related articles from tariff concession negotiations. Prior to such determination, U. S. Tariff Commission would supply the President with a statement that articles meet one or more of the criteria listed in bill in order to reserve those items from the bargaining list at the "Kennedy Round" trade negotiations of GATT at Geneva. Among other things would remove from the bargaining list all commodities for which the Interior Department has research or conservation programs under way pursuant to the Fish and Wildlife Act of 1956. (H. R. 1166, H. R. 1532, and H. R. 2096 shown incorrectly in Commercial Fisheries Review, Feb. 1965 (p. 97) as being similar to H. R. 656 on judicial review of Tariff Commission determinations. Actually they are similar to H. R. 916.)

U. S. FISHING FLEET IMPROVEMENT ACT: Sen. Bartlett in the Senate stated (Congressional Record, Feb. 1, 1965, pp. 1715-1716) that he was pleased that on Jan. 25, 1965, the Department of the Interior conducted the first hearing on an application for a vessel subsidy under Public Law 88-498, the "U. S. Fishing Fleet Improvement Act"; that it would be of great value in the vital, much needed revitalization of our fishing fleet.

VESSEL MEASUREMENT: H. R. 721 (Bonner) introduced in House Jan. 4, 1965, to simplify the admeasurement of small vessels. Would substitute for present complicated method of tonnage measurement a new system which would permit the assignment of tonnages from a table on the basis of length and breadth only. Tonnage would be limited to self-propelled vessels of less than 500 gross tons and nonself-propelled vessels of not more than 997 gross tons; to the Committee on Merchant Marine and Fisheries. Similar to H. R. 81 and S. 2793 in 88th Congress, no action.

VESSEL NUMBERS: House Jan. 28, 1965, received a letter from the Assistant Secretary of the Treasury, transmitting a certified copy of amendments to the regulations governing the numbering of undocumented vessels, promulgated by the Commandant of the U. S. Coast Guard, pursuant to subsection 7 (a) of 46 U.S.C. 527d; to Committee on Merchant Marine and Fisheries.

Senate Jan. 29, 1965, received a letter from the Assistant Secretary of the Treasury, transmitting, pursuant to law, amendments to the regulations governing the numbering of undocumented vessels, to be published in the Federal Register (with accompanying paper); to Committee on Commerce.

WATER POLLUTION CONTROL ACT: S. 560 (Muskie for himself and 13 others) introduced in Senate Jan. 15, 1965, H. R. 4487 (Farbstein) introduced in House Feb. 8, 1965, to amend the Federal Water Pollution Control Act, as amended, and the Clean Air Act, as amended, to provide for improved cooperation by Federal agencies to control water and air pollution from Federal installations and facilities and to control automotive vehicle air pollution; to Senate and House Committee on Public Works, respectively. Similar to H. R. 982.

WATER POLLUTION CONTROL ADMINISTRATION: Special Subcommittee on Air and Water Pollution of Senate Committee on Public Works held hearing Jan. 18, 1965, on S. 4, Proposed Water Quality Act of 1965. Since S. 4 is essentially the same as S. 649, which was the subject of extensive consideration in the 88th Congress and was passed by the Senate on Oct. 16, 1963, the hearing was restricted to comments from Assistant Secretary of Health, Education, and Welfare; Governor of California; and a panel of witnesses consisting of representatives from the Manufacturing Chemists Association, the Pulp & Paperboard Institute, and National Wildlife Federation.

Water Quality Act of 1965: Hearing before a Special Subcommittee on Air and Water Pollution of the Committee on Public Works, United States Senate, 89th Congress, 1st Session, on S. 4 (a bill to amend the Federal Water Pollution Control Act, as amended, to establish the Federal Water Pollution Control Administration, to provide grants for research and development, to increase grants for construction of municipal sewage treatment works, to authorize the establishment of standards of Water Quality to aid in preventing, controlling, and abating pollution of interstate waters, and for other purposes), Jan. 18, 1965, 143 pp., printed. Besides the text of the bill, contains the report of the Department of Health, Education, and Welfare; statements and communications of various government officials, and associations and organizations.

Majority leader Senator Mansfield (Congressional Record, Jan. 22, 1965, p. D. 31) stated his hope that the bill would be brought to the floor for consideration.

Amendment 4 (Javits) and Amendment 5 (Cooper) to S. 4 were presented to the Senate Jan. 26, 1965; to Committee on Public Works. Sen. Javits' amendment and the text of a letter from New York State Conference of Mayors to the President of the United States describing

the need for modification in the existing water pollution legislation were inserted in that day's Congressional Record (pp. 1252-1253). Sen. Cooper stated his amendment would establish procedures that would, at minimum, give to the States and to interstate agencies acting under compacts, municipalities, and industries which are directly concerned the right to be heard concerning water quality standards, promulgated by the Secretary of Health, Education, and Welfare, to present their views in a public hearing after the standard had been published and to propose revisions of such water quality standards.

Senate Committee on Public Works Jan. 27, 1965, reported favorably with amendments S. 4. Committee on same day reported bill to Senate. Consent was obtained by Sen. Mansfield to file minority views on S. 4.

S. Rept. 10, Federal Water Pollution Control Act Amendments of 1965 (Jan. 27, 1965, report from the Committee on Public Works, U. S. Senate, 89th Congress, 1st Session, to accompany S. 4), 37 pp., printed. Committee reported bill favorably with amendments. Discusses purpose and major provisions of the bill; also presents the individual views of Senator Cooper; changes in existing law.

Senate Jan. 28 passed the bill with amendments, after adopting all committee amendments en bloc, and rejecting several other amendments.

House Feb. 1, 1965, received for concurrence S. 4 passed by Senate Jan. 28; referred to Committee on Public Works.

Introduced in House and similar to S. 4: H. R. 3589 (Edwards of Calif.) and H. R. 3605 (Murphy of New York) Jan. 26, 1965, H. R. 3716 (Monagan) Jan. 27, H. R. 3796 (Flood) Jan. 28, H. R. 3988 (Blatnik) Feb. 1, H. R. 4406 (Patten) Feb. 4, H. R. 4264 (McCarthy) Feb. 3, H. R. 4627 (Fallon) Feb. 9, H. R. 4482 (Dingell) Feb. 8, H. R. 4506 (Olsen of Montana) Feb. 8, H. R. 4792 (Ottinger) Feb. 10, to amend the Federal Water Pollution Control Act, as amended, to establish the Federal Water Pollution Control Administration, to provide grants for research and development, to increase grants for construction of municipal sewage treatment works, to authorize the establishment of standards of water quality to aid in preventing, controlling and abating pollution of interstate waters, and for other purposes; to Committee on Public Works. Similar to other bills. Sen. McCarthy in his remarks (Congressional Record, Feb. 3, pp. 1828-1829) pointed out the need to attack the pollution which today menaces not only Lake Erie but most of America's streams, rivers and lakes. He also inserted the address of former Assistant Secretary Frank P. Briggs, U. S. Department of the Interior, at a meeting of the Ohio Commercial Fishermen's Association in Vermillion, Ohio, June 20, 1964.

WATER RESOURCES PLANNING ACT: Irrigation and Reclamation Subcommittee of Senate Committee on Interior and Insular Affairs held hearing Feb. 5, 1965, on S. 21, proposed Water Resources Planning Act of 1965, having as witnesses Bureau of the Budget personnel. Several statements were submitted for inclusion in the record, including one from Sen. Fong. Hearings adjourned subject to call. Subcommittee met Feb. 5 on bill. (The Congressional Record of Jan. 6 listed bill incorrectly as S. 22.)

House Committee on Interior and Insular Affairs held a hearing Feb. 3, 1965, and Full House Committee considered Feb. 10, H. R. 1111, regarding optimum development of the Nation's natural resources.

Would provide for the optimum development of the Nation's natural resources through the coordinated planning of water and related land resources, through the establishment of a water resources council and river basin commission, and by providing financial assistance to the states in order to increase state participation in such planning. Water Resources Council would consist of the Secretaries of Interior; Agriculture; Army; and Health, Education, and Welfare; and Chairman of the Federal Power Commission. The Council would have a staff and coordinate planning activities of Federal agencies concerned with water resources. Bill would establish river basin commissions to coordinate Federal, state, interstate, and local plans for water. Would provide Federal financial grants to the states for planning.

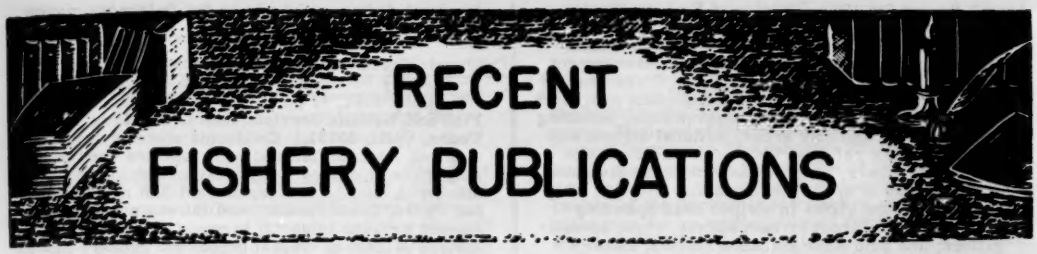
WATER RESOURCES RESEARCH: H. R. 3606 (O'Brien) introduced in House Jan. 26, 1965, and S. 22 (Anderson and 18 others) introduced in Senate Jan. 6, 1965, to promote a more adequate national program of water research; to House and Senate Committee on Interior and Insular Affairs, respectively. Similar to S. 267.

Eighty-Eighth Congress

PESTICIDES AND FISH AND WILDLIFE: Pesticide Research and Controls: Hearing before the Committee on Commerce, United States Senate, 88th Congress, 1st Session, on S. 1250 (a bill to provide for advance consultation with the Fish and Wildlife Service and with State Wildlife Agencies before the beginning of any Federal program involving the use of pesticides or other chemicals designed for mass biological controls) and S. 1251 (a bill to amend the Act of Aug. 1, 1958, in order to prevent or minimize injury to fish and wildlife from the use of insecticides, herbicides, fungicides, and pesticides), June 6, 1963, Serial 66, 70 pp., printed. Includes texts of bills; Federal government agency reports; statements, letters, wires, resolutions, etc., of various Congressmen, associations and organizations, and individuals.

PRICE QUALITY STABILIZATION: Quality Stabilization: Hearings before a Subcommittee of the Committee on Commerce, United States Senate, 88th Congress, 1st and 2nd Sessions, on S. 774 (a bill to amend the Federal Trade Commission Act, to promote quality and price stabilization, to define and restrain certain unfair methods of distribution and to confirm, define, and equalize the right of producers and resellers in the distribution of goods identified by distinguishing brands, names, or trademarks, and for other purposes), June 5, Aug. 19, Sept. 9, Oct. 9, Nov. 7, 13, Dec. 9, 1963, Jan. 22, 23, and Feb. 19, 1964, Serial 65, 709 pp., printed. Includes text of bill; comments, statements, and letters from various government agencies, Federal officials, business officials, and organizations.

Note: REPORT ON FISHERY ACTIONS IN 88TH CONGRESS: The U. S. Bureau of Commercial Fisheries has issued a leaflet on the status of all legislation of interest to commercial fisheries at the end of the 88th Congress. For copies of MNL-3--Legislative Actions Affecting Commercial Fisheries, 88th Congress, 1st Session 1963 and 2nd Session 1964, write to the Fishery Market News Service, U. S. Bureau of Commercial Fisheries, 1815 N. Fort Myer Drive, Room 510, Arlington, Va. 22209. Requests for this leaflet will be filled on a first-come first-served basis until the supply is exhausted.



FISH AND WILDLIFE SERVICE PUBLICATIONS

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CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES.
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SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.
SSR.- FISH. - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).

Number — Title

CFS-3455 - Packaged Fishery Products, 1963 Annual Summary (Revised), 5 pp.
CFS-3515 - Gulf Coast Shrimp Data, 1963 Annual Summary, 53 pp.
CFS-3652 - Massachusetts Landings, April 1964, 9 pp.
CFS-3653 - Massachusetts Landings, May 1964, 9 pp.
CFS-3657 - Gulf Coast Shrimp Data, July 1964, 21 pp.
CFS-3658 - Michigan, Ohio & Wisconsin Landings, July 1964, 4 pp.
CFS-3659 - North Carolina Landings, September 1964, 4 pp.
CFS-3661 - Texas Landings, August 1964, 2 pp.
CFS-3662 - New Jersey Landings, September 1964, 3 pp.
CFS-3663 - Fish Sticks, Fish Portions, and Breaded Shrimp, July-September 1964, 3 pp.
CFS-3664 - California Landings, July 1964, 4 pp.
CFS-3666 - South Atlantic Fisheries, 1963 Annual Summary, 8 pp.
CFS-3667 - Georgia Landings, September 1964, 2 pp.
CFS-3670 - Frozen Fishery Products, October 1964, 8 pp.
CFS-3671 - Imports & Exports of Fishery Products, 1962-63 Annual Summaries, 12 pp.
CFS-3673 - Maryland Landings, September 1964, 4 pp.
CFS-3674 - South Carolina Landings, September 1964, 3 pp.
CFS-3675 - New York Landings, September 1964, 5 pp.
CFS-3676 - Massachusetts Landings, June 1964, 9 pp.
CFS-3677 - Michigan, Ohio & Wisconsin Landings, August 1964, 4 pp.
CFS-3678 - Virginia Landings, September 1964, 4 pp.
CFS-3680 - Shrimp Landings, August 1964, 5 pp.
CFS-3682 - Louisiana Landings, September 1964, 3 pp.
CFS-3685 - Alabama Landings, September 1964, 3 pp.
CFS-3686 - South Carolina Landings, October 1964, 3 pp.
CFS-3687 - Florida Landings, October 1964, 8 pp.
CFS-3689 - Rhode Island Landings, July 1964, 3 pp.
CFS-3690 - Georgia Landings, October 1964, 3 pp.
CFS-3693 - Maine Landings, September 1964, 4 pp.

Sep. No. 726 - Experimental Trawling for High-Seas Salmon.

Sep. No. 727 - Estimating Residual Shell in Shucked Soft-Shell Clams (Mya arenaria L.).

FL-448 - Some Publications on Fish Culture and Related Subjects, 14 pp., revised August 1964.

FL-571 - Parasites of Freshwater Fish. II--Protozoa. 1--Microsporidea of Fish, by R. E. Putz, 4 pp. illus., August 1964.

FL-574 - Fishing Vessel Construction Differential Subsidy, 14 pp., processed, November 1964. Discusses the United States Fishing Fleet Improvement Act (P. L. 88-498), approved August 30, 1964, effective December 22, 1964. The purpose of the Act is to correct inequities in the cost of construction of U. S. fishing vessels. The Secretary of the Interior is authorized to pay up to 50 percent of the cost of construction of a new fishing vessel provided the vessel, the owner of the vessel, and the fishery in which the vessel will operate meet certain requirements. The amount that can be paid is limited to the difference between the cost of construction in domestic and foreign shipyards or 50 percent of the domestic cost, whichever is smaller. The determination of the foreign cost will be made by the Maritime Administrator. Eligibility for the subsidy is restricted to vessels of advanced design, capable of fishing in expanded areas (fishing grounds not usually fished by the majority of vessels working in a particular fishery), equipped with newly developed gear, and scheduled for operation in a fishery where such use will not cause economic hardship to other operators now in that fishery. ("Newly developed gear" is defined as the most modern gear available that is suitable for use in the fishery for which the proposed vessel is designed.) The regulations provide for hearings on each contract under the new law. Such hearings will allow any person who feels he will be economically injured by the construction of the proposed vessel an opportunity to present evidence of potential economic losses. The United States Fishing Fleet Improvement Act authorized the appropriation of $10 million annually for the construction subsidy program. Congress has appropriated $2½ million to start the program during the current fiscal year (ending June 30, 1965).

SSR-Fish. No. 488 - Spawning Ground Catalog of the Kvichak River System, Bristol Bay, Alaska, compiled by Robert L. Demory, Russell F. Orrell, and Donald R. Heinle, 302 pp., illus., June 1964.

Annual Report for 1963, Division of Fishery Management Services, by Willis King, Circular 194, 50 pp., illus., July 1964. Includes information on accomplishments of the Division of Fishery Management Services of the U. S. Bureau of Sport Fisheries and Wildlife during 1963; fishery management programs on Federal areas and Indian reservations, including Department of Defense areas, National forests and parks, wildlife refuges, Veterans Administration areas, and others; cooperation with other divisions of the Bureau of Sport Fisheries and Wildlife; cooperation with the states in striped bass spawning study, Kentucky trout stream survey, river investigations, and acid mine pollution studies; fishery management programs on other waters such as privately-owned lakes; training and extension activities; and cooperative fishery units.

Fishery Bulletin, vol. 63, no. 2, 1964, 242 pp., illus., printed. Contains articles on: "Sexual maturation and spawning of Atlantic menhaden," by Joseph R. Higham and William R. Nicholson; "An experimental evaluation of the C^{14} method for measuring phytoplankton production using cultures of Dunaliella primolecta Butcher," by William H. Thomas; "Dentition of the northern fur seal," by Victor B. Scheffer and Bertram S. Kraus; "A benthic community in the Sheepscot River Estuary, Maine," by Robert W. Hanks; "Upwelling in the Costa Rica Dome," by Klaus Wyrtki; "Preconstruction study of the fisheries of the estuarine areas by the Mississippi River-Gulf Outlet Project," by George A. Rounsefell; "A morphometric study of yellowfin Thunnus albacores (Bonnaterre)," by William F. Royce; "Origins of high seas sockeye salmon," by Fred C. Cleaver; and "The relation between spawning-stock size and year-class size for the Pacific sardine (Sardinops caerulea) Girard)," by John S. MacGregor.

THE FOLLOWING MARKET NEWS LEAFLETS ARE AVAILABLE FREE FROM THE FISHERY MARKET NEWS SERVICE, U. S. BUREAU OF COMMERCIAL FISHERIES, RM. 510, 1815 N. FORT MYER DR., ARLINGTON, VA. 22209.

Number	Title
MNL-10	Swedish Fisheries, 1963, 10 pp.
MNL-13	India's Fishing Industry, 1963, 12 pp.
MNL-17	Italian Fisheries, 1963, 9 pp.
MNL-23	Fisheries of Chile, Part I, North Chile, 1963 and January-June 1964, 32 pp.
MNL-60	Netherland's Fisheries, 1963, 8 pp.
MNL-93	Tuna Fishery of Western and Southern Africa, 13 pp.

THE FOLLOWING ENGLISH TRANSLATION OF A FOREIGN LANGUAGE REPORT IS AVAILABLE ON LOAN ONLY FROM THE BIOLOGICAL LABORATORY, U. S. BUREAU OF COMMERCIAL FISHERIES, 2725 MONTLAKE BLVD. E., SEATTLE, WASH. 98102.

Fishing for Cephalopod Molluaks and Their Biological and Economic Importance, by Elvezio Chirardelli, 8 pp., processed, 1962. (Translated from the Italian, General Fisheries Council for the Mediterranean Technical Paper No. 40/60.)

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

(Baltimore) Monthly Summary--Fishery Products, November 1964, 10 pp. (Market News Service, U. S. Fish and Wildlife Service, 103 S. Gay St., Baltimore, Md. 21202.) Receipts of fresh- and salt-water fish and shellfish at Baltimore by species and by states and provinces; total receipts by species and comparisons with previous periods; and wholesale prices for fresh fishery products on the Baltimore market; for the month indicated.

California Fishery Market News Monthly Summary, Part I - Fishery Products Production and Market Data, November 1964, 17 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, sardines, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; for the month indicated.

California Fishery Market News Monthly Summary, Part II - Fishing Information, November 1964, 8 pp., illus. (U. S. Bureau of Commercial Fisheries, Tuna Resources Laboratory, P. O. Box 271, La Jolla, Calif. 92038.) Contains sea-surface temperatures, fishing and research information of interest to the West Coast tuna-fishing industry and marine scientists; for the month indicated.

(Chicago) Monthly Summary of Chicago's Wholesale Market Fresh and Frozen Fishery Products Receipts, Prices, and Trends, September and October 1964, 18 and 19 pp., respectively. (Market News Service, U. S. Fish and Wildlife Service, U. S. Customs House 610 S. Canal St., Rm. 704, Chicago, Ill. 60607.) Receipts at Chicago by species and by states and provinces for fresh- and salt-water fish and shellfish; and weekly wholesale prices for fresh and frozen fishery products; for the months indicated.

Gulf of Mexico Monthly Landings, Production and Shipments of Fishery Products, November 1964, 11 pp. (Market News Service, U. S. Fish and Wildlife Service, Rm. 608, 600 South St., New Orleans, La. 70130.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; fishery imports at Port Isabel and Brownsville, Texas, from Mexico; Gulf menhaden landings and production of meal, solubles, and oil; and sponge sales; for the month indicated.

Halibut and Troll Salmon Landings and Ex-Vessel Prices for Seattle, Alaska Ports and British Columbia, 1964-1963, 35 pp., December 16, 1964. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Bldg., Seattle, Wash. 98104.) Gives landings and ex-vessel prices of troll salmon and halibut at leading United States ports of the Pacific Coast; ex-vessel halibut prices and landings at leading British Columbia ports; United States and Canadian Pacific Coast halibut landings, 1936-1964; halibut landings at leading Pacific Coast ports, 1961-1964; and troll salmon landings and receipts at Seattle and Alaska ports, 1961-1964.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, November and December 1964, 4 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 18 S. King St., Hampton, Va. 23369.) Landings of food fish and shellfish and production of crab meat and shucked oysters for the Virginia areas of Hampton Roads, Chincoteague, Lower Northern Neck, and Lower Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Caro-

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lina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data on fishery products and shrimp production; for the months indicated.

New England Fisheries--Monthly Summary, November 1964, 22 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston, Mass. 02210.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial-fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, and Provincetown), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and Boston Fish Pier and Atlantic Avenue fishery landings and ex-vessel prices by species; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly Summary, September 1964, 19 pp. (Market News Service, U. S. Fish and Wildlife Service, 155 John St., New York, N. Y. 10038.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, including both the salt- and fresh-water sections; imports entered at New York customs district; primary wholesalers' selling prices for fresh, frozen, and selected canned fishery products; marketing trends; and landings at Fulton Fish Market docks and Stonington, Conn.; for the month indicated.

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, December 1964, 8 pp. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Office Bldg., 909 First Ave., Seattle, Wash. 98104.) Includes Seattle's landings by the halibut and salmon fleets reported through the exchanges; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl vessels reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines, and ex-vessel landings; and imports from other countries through Washington customs district; for the month indicated.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ACCLIMATIZATION:

"Ispol'zovanie vnutrividovoi izmenchivosti v rabotakh po akklimatizatsii ryb" (Use of intra-species variability in work on the acclimatization of fish), by S. I. Doroshev, article, Referativnii Zhurnal-Biologiia, 1963, No. 8196, printed in Russian. Akademiia Nauk SSSR, Nauchnoi-Informatsii, Moscow, U.S.S.R.

ALEWIVES:

A Report upon the Alewife Fisheries of Massachusetts, Contribution No. 11, 135 pp., illus., reprinted, 1964, 71 cents. Division of Marine Fisheries, Department of Natural Resources, 15 Ashburton Pl., Boston 8, Mass. Part I discusses the importance of the alewife fishery, natural history, natural and artificial fisheries, causes of the decline in the fishery, and remedial measures for reconstruction of the industry. In Part II, a brief description of each alewife stream in Massachusetts is given, and the practical methods for restoration of the fishery are presented.

ALGAE:

Automatic Control of Algae Cultures, by Ye. A. Ivanov and I. V. Aleksandrova, OTS 63-41013, 8 pp., processed, Oct. 28, 1963, 50 cents. (Translated from the Russian, Uspekhi Sovremennoy Biologii, vol. 56, no. 1, 1963, pp. 90-97.) Office of Technical Services, U. S. Department of Commerce, Wash., D. C. 20230.

"Chemical studies on the green alga, Monstroma nitidum Wittrock. III--Inorganic components of the alga and its mucilage," by Shizuhiko Maeshige, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 29, Apr. 1963, pp. 359-361, printed. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-Kaigandori 6, Minato-ku, Tokyo, Japan.

"Lipids of algae. Part III--The components of unsaponifiable matter of the algae Chlorella," by Ihei Iwata and Yosito Sakurai, article, Agricultural and Biological Chemistry, vol. 27, Apr. 1963, pp. 253-258, printed. Charles E. Tuttle Co., Tokyo, Japan.

The following reports, processed in Spanish, are part of the Serie: Trabajos de Divulgacion and are available from the Departamento de Estudios Biologicos Pesqueros, Direccion General de Pesca e Industrias Conexas, Secretaria de Industria y Comercio, Mexico, D. F.

Clave Dicotomica para la Determinacion de Algas Marinas del Pacifico (Dichotomous Key for the Identification of Marine Algae of the Pacific), by Gilbert M. Smith, vol. VII, no. 68, 27 pp., Sept. 1963. (Translated from the English, Marine Algae of the Monterey Peninsula, California, 1944.)

La Explotacion de Algas en Baja California (The Exploitation of Algae in Baja California), by Hector Chapa Saldana, vol. IX, no. 84, 34 pp., 1964.

Notas sobre el Aprovechamiento Industrial de Algunas Agarofitas (Notes on the Industrial Utilization of some Agar-Bearing Plants), by Hector Chapa Saldana, vol. VI, no. 64, 26 pp., June 1963.

ALGERIA:

Foreign Trade Regulations of the Republic of Algeria, by Robert S. McClellan, OBR 64-122, 8 pp., printed, Nov. 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) The primary aims of the Algerian Government's foreign trade policy are the limitation of imports to those items considered essential for domestic consumption or economic development and the protection of local production. The report discusses

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Algeria's import tariff system, sales and other internal taxes, documentation and fees, labeling and marking requirements, and special customs provisions. Also covers nontariff import controls, export controls, United States foreign trade controls, and Government representation between the two countries.

ALMANAC:

The American Ephemeris and Nautical Almanac for the Year 1966, 508 pp., illus., printed, 1964. $3.75. Nautical Almanac Office, U. S. Naval Observatory, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Basic calculations and data, fundamental tables and constants.

ANCHOVY:

"Vesennyaya migratsiya chernomorskoi khamsy v 1959 g. i prisposobitel'nye osobennosti ee nerestovykh populyatsii" (Spring migration of the Black Sea anchovy in 1959 and the adaptive characteristics of its spawning population), by N. N. Danilevskii, article, Referativnii Zhurnal-Biologiia, 1963, Abstract No. 8155, printed in Russian. Akademiia Nauk SSSR, Nauchnoi-Informatsii, Moscow, U.S.S.R.

BOTULISM:

"A simple method for the detection of Botulinus toxins and bacilli," by M. Zeller, article, Archiv fur Lebensmittelhygiene Insbesondere fur Fleish, Fisch, un Milchhygiene, vol. 15, no. 4, 1964, pp. 84-87, printed in German. Verlag M & H Schaper, Grazer Strasse, Hannover 20, Germany.

"What you should know about Botulism," article, Food Engineering, vol. 36, July 1964, pp. 104-106, printed. Chilton Co., Chestnut and 56th Sts., Philadelphia 39, Pa.

BRAZIL:

The following publications are reprinted (in Portuguese) from Boletim de la Sociedade Cearense de la Agronomia, vol. 5, June 1964. Sociedade Cearense de la Agronomia, Fortaleza, Ceara, Brazil:

Pescarias de Jangadas no Litoral Sul de Pernambuco, Brasil ("Jangadas" Fisheries on the Southern Coast of Pernambuco, Brazil), by Hitoshi Nomura, pp. 67-76, with English summary.

Sobre a Producao Brasileira de Pescado, no Quinquenio 1956-1960 (On Brazilian Fishery Production, in the Five-Year Period 1956-1960), by Melquiades Pinto Paiva, pp. 87-98.

CANADA:

"Canadian summer fisheries, 1964," article, Trade News, vol. 17, no. 4, Oct. 1964, pp. 9-13, processed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada. In Canada expansion is strongest on the Atlantic coast where new large freezing plants are coming into production and where the fishermen in 1964's spring and summer fisheries earned nearly C$59 million, about $6 million more than in 1963 and $12 million more than the five-year average of 1959-63. In the Maritimes, the 3-million-pound increase over the previous year in the inshore groundfish catch was due in part to greater effort, resulting from uniformly high prices to fishermen. To the end of August the 1964 output of frozen sea fish, excluding shellfish, was 16 percent greater than in 1963 and sales were so satisfactory that stocks on hand were smaller by 18 percent. The scallop industry continued its expansion with a summer catch of over 8 million pounds valued at between $3 and $4 million, one million dollars more than in the previous summer. The swordfish catch continued its sharp climb in quantity and value. Fishermen in Quebec, however, were not so fortunate. After an excellent spring, with good catches of cod, halibut, herring, and smelts, their summer operations were not so successful. Newfoundland fishermen's gross income for 1964 stood at the end of August at $15.5 million. British Columbia's salmon catch was better than expected, the pack already exceeding one million cases at the end of August with large supplies coming regularly. The decline in fresh-water fisheries was due to smaller catches and consequently smaller output.

Journal of the Fisheries Research Board of Canada, vol. 21, no. 5, Sept. 1964, 479 pp., illus., printed, single copy C$2.25. Queen's Printer, Ottawa, Canada. Includes, among others, these articles: "A new species of parasitic copepod, Caligus clemensi sp. nov. (Caligoida: Caligidae), from pelagic fishes in the coastal waters of British Columbia," by R. R. Parker and L. Margolis; "Preliminary observations on the vertical distribution of Pacific salmon (genus Oncorhynchus) in the Gulf of Alaska," by J. I. Manzer; "Ocean growth and mortality of pink and chum salmon," by W. E. Ricker; "Oceanographic regions and assessment of temperature structure in the seasonal zone of the north Pacific Ocean," by John P. Tully; "Salinity preference: an orientation mechanism in salmon migration," by John E. McInerney; "Estimation of sea mortality rates for the 1960 brood-year pink salmon of Hook Nose Creek, British Columbia," by Robert R. Parker; "Seasonal variations in the sterol, fat and unsaponifiable components of scallop muscle," by D. R. Idler, T. Tamura, and T. Wainai; "Preliminary results of studies on growth and mortality of Pacific cod (Gadus macrocephalus) in Hecate Strait, British Columbia," by K. S. Ketchen; "Growth rate of central British Columbia pink salmon (Oncorhynchus gorbuscha)," by R. J. LeBrasseur and R. R. Parker; "Distribution and synonymy in the Pacific Ocean, and variation, of the Greenland halibut, Reinhardtius hippoglossoides (Walbaum)," by Carl L. Hubbs and Norman J. Wilimovsky; "Distribution of introduced marine Mollusca in British Columbia waters," by D. B. Quayle; "The respiratory metabolism and swimming performance of young sockeye salmon," by J. R. Brett; "Ocean migrations of Pacific salmon," by Ferris Neave; "A model for simulation of the population biology of Pacific salmon," by P. A. Larkin and A. S. Hourston; "A key to five species of Pacific salmon (genus Oncorhynchus) based on scale characters," by H. T. Bilton, D. W. Jenkinson, and M. P. Shepard; "A Quantitative estimate of the number of Pacific herring in a spawning population," by D. N. Outram and F. H. C. Taylor; and "Further information on spawning stock size and resultant production for Skeena sockeye," by M. P. Shepard and others.

Rapport sur les Pecheries pour l'Exercice Financier 1962/63 (Report on the Fisheries for the Fiscal Year 1962/63), 1 vol., illus., printed in French. Quebec Department of Trade and Commerce, Quebec, Canada.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Seventeenth Annual Report, 1963/64, 11 pp., printed, 1964. Fisheries Prices Support Board, Ottawa, Canada.

CANNING:

"Fish cooker tray," (British Patent 935,989), article, Food Manufacture, vol. 39, May 1964, p. 81, printed. Grampian Press, Ltd., The Tower, Shepherds Bush Rd., Hammersmith, London W6, England.

CEYLON:

Administration Report of the Director of Fisheries for 1962-63, Part IV--Education, Science and Art (L), 84 pp., printed in Singhalese and English, 2/75 plus postage -/50 (about 55 U. S. cents plus postage). Government Publications Bureau, P. O. Box 500, Secretariat, Colombo, Ceylon. Reports on the activities of the Ceylon Department of Fisheries for 1962-63. Includes information on international assistance, disputes and regulations, loans to fishermen, cooperative societies, housing for fishermen, coastal navigation aids, and fishing harbors. Also covers fresh- and brackish-water fisheries, pearl fisheries, Mutwal fisheries factory and harbor, trawler fishing, and fisheries research. Included are statistical tables giving data on production of fresh-water and marine fish, mechanized fishing vessels, and imports and exports of fishery products for fiscal year October 1962-September 1963.

Bulletin of the Fisheries Research Station, Ceylon, vol. 17, no. 1, June 1964, 150 pp., illus., printed, single copy Rs. 5.00 (about US$1). Fisheries Research Station, Colombo, Ceylon. Includes these articles: "Socio-economic survey of fisher families, 1958-59," by G. N. De Silva; "A review of the parasitic copepods of fish recorded from Ceylon with descriptions of additional forms," by P. Kirtishighe; and "Assessment and possible development of the fishery resources of Pedro Bank," by S. Sivalingam.

CLAMS:

The following reports are available from the Division of Marine Fisheries, Department of Natural Resources, 15 Ashburton Pl., Boston 8, Mass.:

The Quahaug Fishery of Massachusetts (Including the Natural History of the Quahaug and a Discussion of Quahaug Farming), by David L. Belding, Marine Fisheries Series--No. 2, Contribution No. 5, 41 pp., illus., reprinted, 1964, 44 cents. Part I, covering the natural history of the quahaug, discusses its anatomy, early life history, the habits of the quahaug, the rate of growth, natural conditions affecting growth, and growth tables. Part II, concerning the quahaug fishery, describes the fishing grounds, industrial practices, laws pertaining to that clam, and quahaug culture.

The Soft-Shelled Clam Fishery of Massachusetts (Including the Natural History of the Soft-Shelled Clam and a Discussion of Sewage Pollution and Shellfish), by David L. Belding, Marine Fisheries Series--No. 1, Contribution No. 3, 65 pp., illus., reprinted, 43 cents, 1964. Part I, on natural history of the soft-shelled clam (Mya arenaria), covers distribution, anatomy, spawning, early life history, movements, enemies, growth, conditions regulating its growth, and growth tables. Part II, on clam culture, discusses clam farming, laws, operating the clam farm, and the clam set. Part III, on the Massachusetts clam fishery, covers history of the fishery, fishing grounds, the clam industry, and methods of improving the clam fishery. Part IV, on sewage pollution and shellfish, describes shellfish and disease, methods of determining polluted shellfish areas, shellfish pollution in Massachusetts, biological activities of the clam, and purification by chlorine treatment.

CLAMS AND OYSTERS:

A Report upon the Quahaug and Oyster Fisheries of Massachusetts (Including the Life History, Growth and Cultivation of the Quahaug--Venus mercenaria--and Observations on the Set of Oyster Spat in Wellfleet Bay), Contribution No. 12, 205 pp., illus., printed, 1964, 89 cents. Division of Marine Fisheries, Department of Natural Resources, 15 Ashburton Pl., Boston 8, Mass. The section devoted to the quahaug discusses the distribution and range of that clam; the anatomy and its relation to the quahaug's habits; and the spawning, early life history, reproduction, and propagation. Also covered are the habits of both young and adult, the rate of growth, the quahaug fishery--its present extent and possibilities, and the cultivation of quahaugs. The section on oyster spat includes information on the natural history of the American oyster (Ostrea virginica), methods of spat collection, spat conditions in Wellfleet Bay, collection of spat with a plankton net, spat-collecting experiments, and results of a spat survey in Wellfleet Bay in 1908.

COD:

"The effect of gear on spawning cod," by Gunnar Sundnes, article, World Fishing, vol. 13, July 1964, pp. 59-60, printed. John Trundell & Partners Ltd., St. Richard's House, Eversholt St., London NW1, England.

"Polyphosphate treatment of frozen cod. Protein extractability and lipid hydrolysis," by W. J. Dyer and others, article, Journal of the Fisheries Research Board of Canada, vol. 21, no. 1, Jan. 1964, pp. 101-106, illus., printed. Queen's Printer, Ottawa, Canada.

The following articles are from Rybnoe Khoziaistvo, 1962, Rybnoe Khoziaistvo, V. Krasnoselskaia 17, B-140, Moscow, U.S.S.R.:

"Biologiya treski raionov Labradora i N'yufaundlenda" (Biology of the cod of the Labrador and Newfoundland regions), by A. I. Postolakii, pp. 345-354, printed in Russian with English summary.

"Nekotorye dannye po pitaniyu treski v N'yufaundlendskom raione Severo-Zapadnoi Atlantiki" (Some data on the food of cod in the Newfoundland region of the northwestern Atlantic), by O. A. Popova, pp. 235-253, printed in Russian with English summary.

"Pitanie treski v vodakh Zapadnoi Grenlandii" (The food of cod in West Greenland), by I. N. Sidorenko, pp. 255-261, printed in Russian with English summary.

"Razmernovozrastnoi sostav i nerest treski na yugo-zapadnom sklone banki Flemish-Kap" (Size and age composition and spawning of cod on the southeastern slope of the Flemish Cap), by E. M. Mankevich and V. S. Prokhorov, pp. 355-360, printed in Russian.

COMMISSIONS:

Gulf States Marine Fisheries Commission Fifteenth Annual Report, 1963-1964 (to the Congress of the

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United States and to the Governor and Legislators of Alabama, Florida, Louisiana, Mississippi, and Texas), 44 pp., illus., printed. Gulf States Marine Fisheries Commission, 312 Audubon Bldg., New Orleans, La. 70112. Outlines the Commission's activities for the period Oct. 1963-Oct. 1964, with a summary of actions and recommendations. Describes briefly the activities of each of the member States during that period. Includes short discussions of U. S. Fish and Wildlife Service activities in shellfish, menhaden, bottomfish, and pelagic fish exploration; offshore gear research; faunal assessment; experiments in electrical stimulation of pink shrimp; and studies of spawning and population dynamics of shrimp. Also discusses the shrimp ecology program, estuarine program, industrial bottomfish studies, pesticides program, red tide program, biochemical studies of blue crab, studies of the botulism organism, standards and specifications program, the Inspection Service, marketing programs, and financial assistance to the commercial fishing industry. Also contains the financial report of the Commission for the year ended June 30, 1964.

CONGO REPUBLIC (BRAZZAVILLE):

Basic Data on the Economy of the Republic of Congo (Brazzaville), by Charles E. Rushing, OBR 64-100, 12 pp., illus., printed, Nov. 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) The Congo has few natural resources and generally infertile soil. The agriculture is almost entirely oriented toward the production of foodstuffs for local consumption. The country's industrial production is relatively insignificant, limited to the wood industry, sugar refining, soap, beer, and canned fish. The report discusses general information on the two Congos, geography and climate, Government, population, and education; structure of the economy; agriculture; livestock; forestry; petroleum and mining; industry; and power supplies. Also covers transportation, communications, finance, foreign trade, program for economic development, marketing, and diplomatic representation between the Congo and the United States. A section on fishing and fish processing explains that most fishing is done along ocean beaches and river banks, and the catch is generally consumed by the African population. A new fishing operation has recently begun construction of a 1,500 ton freezing and temporary cold-storage plant for tuna which is shipped to the United States and Europe for canning.

COOLING:

"Cooling fish in ice and sea water," by J. Herrmann and A. Wolschon, article, Journal of the Science of Food and Agriculture, vol. 14, no. 12, 1963, p. ii 304, printed. Society of Chemical Industry, 14 Belgrave Sq., London SW1, England.

CRABS:

King Crab, PARALITHODES CAMTSCHATICA (Tilesius), Trawl Survey of Long Island Bank, East of Kodiak Island, Alaska, June 1963, by Richard E. Reynolds and Guy C. Powell, Informational Leaflet 44, 8 pp., illus., processed, Aug. 1964. Department of Fish and Game, Subport Bldg., Juneau, Alaska.

"Processing of canned crab from frozen material," by E. Tanikawa, M. Akiba, and T. Motohiro, article, Refrigeration, vol. 39, no. 437, Mar. 1964, pp. 1-10, illus., printed in Japanese. Nihon Reito Kyokai, No. 3, 1-Chome, Ginza Nishi, Chuo-ku, Tokyo, Japan.

The following reports, processed in Spanish, are part of the Serie: Trabajos de Divulgacion and are available from the Departamento de Estudios Biologicos Pesqueros, Direccion General de Pesca e Industrias Conexas, Secretaria de Industria y Comercio, Mexico, D. F.:

Claves de Identificacion de Cangrejos Grapsoideos de America (Key to the Identification of Grapsoid Crabs of America), by Mary J. Rathbun, vol. IX, no. 82, 47 pp., illus., Jan. 1964. (Translated from the English, The Grapsoid Crabs of America, Bulletin 97, U. S. National Museum, Washington, D. C., 1918.)

Claves de Identificacion para los Cangrejos Oxystomados de America (Key to the Identification of the Oxystomatous Crabs of America), by Mary J. Rathbun, vol. IX, no. 83, 21 pp., illus., Apr. 1964. (Translated from the English, The Oxystomatous and Allied Crabs of America, Bulletin No. 166, U. S. National Museum, Washington, D. C., 1937.)

CRAYFISH:

"Adaptation in stretch receptor neurons of crayfish," by Shigehiro Nakajima, article, Science, vol. 146, no. 3648, Nov. 27, 1964, pp. 1168-1170, illus., printed, single copy 35 cents. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D. C. 20005.

CROAKER:

Studies on the Fishery Biology of the Yellow Croaker in the East China and the Yellow Seas, by Ikuo Ikeda, Bulletin No. 31, 80 pp., printed in Japanese with English summary, 1964. Sekai Regional Fisheries Research Laboratory, Suisan-cho Seikai-ku, Suisan Kenkyusho, Marvo-Machi, Nagasaki-shi, Japan.

CRUSTACEANS:

Lista Preliminar de los Crustaceos Existentes en el Laboratorio Central del I.N.I.B.P. (Preliminary List of the Crustaceans Living in the Central Laboratory of the National Institute for Fishery Biological Investigations), by Hector Chapa Saldana, Serie Trabajos de Divulgacion, no. IX, no. 87, 41 pp., processed in Spanish, Feb. 1964. Departamento de Estudios Biologicos Pesqueros, Direccion General de Pesca e Industrias Conexas, Secretaria de Industria y Comercio, Mexico, D. F.

DENMARK:

Danmarks Fiskeri Erhverv (Denmark's Fishing Industry), Vol. I, edited by Anders Finsing, 473 pp., Apr. 1964; Vol. II, edited by Zinklar Zinglersen, 523 pp., October 1964, illus., printed in Danish, limited edition, $90. Forlaget Liber A/S, Copenhagen, Denmark. Volume I consists of 10 sections preceded by a historical review of the fisheries. The sections include one or more articles by experts in the various fields. With a few exceptions most of the articles are historical and general in content. The sections cover the following subjects: (1) growth of fishing industry organizations--2 historical articles on the 2 largest organizations of fishermen; (2) the fishermen in art and culture--4 articles with more history and references to the stage, literature, and painting; (3) vessels,

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methods, and gear--4 general articles on vessel history, steel cutters, mechanization, and methods and gear; (4) allied services--articles on rescue services, rescue vessels, and weather and radio services; (5) trade and industry--12 articles on canning, filleting, industrial fish, fish meal and oil, pond trout culture, pond trout research, smoking, wholesaling and exporting, retailing, Copenhagen's Fish Market, fishery cooperatives, and present industry structure; (6) Greenland and the Faroes--2 general articles summarizing the fish and fisheries of Greenland and a brief review of the Faroese industry; (7) research--a 28-page explanation of research programs and progress; (8) insurance and financing--2 brief but descriptive articles on fishermen's accident insurance and vessel insurance, and one on industry financing; (9) education--a historical general discussion; and (10) administration and organizations--a listing of Fisheries Ministry officials, offices, laboratories, and other activities plus brief data on the 2 large fishermen's organizations and the national association of organizations, and on 14 smaller trade groups organized according to their producing, processing, and marketing interests. Volume II represents the first attempt to provide biographical and technical data on living persons engaged in the Danish fishing industry. About 4,800 persons are included, listed alphabetically by surname. The average sketch runs about 70 words, concluding with the current occupation and address. About one-third of the sketches include photographs. A spot check of the entries indicates that a great many are vessel skippers, simply because the Danish fishing fleet has over 4,000 motored vessels over 5 gross tons. However, other activities in the fishing industry also seem to be relatively well represented.

--A. W. Anderson

Fiskeriarbogen 1965 (The Fisheries Yearbook, 1965), edited by J. Fr. Simony, 861 pp., illus., printed in Danish, Nov. 1964, 13 Kr. (about US$1.90) plus 9 percent tax. Iver C. Weilbach & Company, Amaliegade 30, Copenhagen K, Denmark. A comprehensive collection of information on navigation, fishery rules and regulations, inspection, and other information, primarily for Danish, Faroese, and Greenland fishermen, but it also is used by yachtsmen and small craft. It is issued annually by the Ministry of Fisheries in December for the following year, the current issue being the 72nd edition. Subjects covered include the 1965 calendar; navigation tables, courses, and distances; rules of navigation and carrying of lights--harbor bylaws, buoyage, precautions with respect to submarine cables, light and signal stations, radio telephony, and telegraphy; and Acts and regulations governing the fishing industry (including the Northeast Atlantic Convention) in Denmark, Faroe Islands, and Greenland--control of quantity and exports of fish, fisheries statistics, and shipping. Also discussed are harbor signal letters and index of fishing vessels; Acts and regulations governing inspection of ships, ship construction and equipment, medical supplies, and medical examination of crews; fishery inspection and quarantine regulations; accident insurance; Acts concerning loans to the fishing industry; Acts and regulations about hunting; guidance on shipwrecks and accidents; institutions and addresses; and fish names and market classifications, courses, measures and weights. There is a detailed alphabetical index of the subject matter, and a list, by type of product, of the numerous trade advertisements in the Yearbook. The final section is an illustrated article "Aids to navigation (buoyage) in Danish Waters." The Nordic countries have agreed upon uniform colors for marking buoys. Danish authorities will carry out the changes in Danish waters in the spring of 1965.

--A. W. Anderson

DIRECTORIES:

Fisheries Year Book and Directory, 1964, 508 pp., illus., printed, $4.50 postpaid. British-Continental Trade Press Ltd., 222 Strand, London WC2, England. Contains short summaries of fishery landings and production in some of the leading countries of the world. After a short introductory chapter on the prospects for the world's fisheries, the book describes developments, landings, and production in the United Kingdom, United States, Japan, Iceland, the U.S.S.R., and the Federal Republic of Germany. Under the title of "Around the World," there are pithy summaries covering catches, foreign trade, processing, fishing fleets, and industrial products in 54 other countries from Algeria to Zanzibar. Under "Preservation of Fish" is described the work of the Torry Research Station (Aberdeen) and the Humber Laboratory (Hull). Progress in quick-freezing, packaging, and handling frozen fish is discussed. There are articles on (1) standards and requirements for handling, processing, and distribution of fish and quality control; (2) manufacture of fishing nets; (3) developments in fish meal. A chapter on the construction and design of fishing vessels describes features of interesting new vessels built in 1963, and lists the vessels built or under construction in various fishery countries. Includes a dictionary of fish names in eight languages; a fish supply calendar; a list of the fishery organizations throughout the world; a list of trade journals of interest to the fishery industry; a world directory giving the particulars of over 5,000 firms in 68 countries, including fishing companies, wholesalers, importers, canners, firms dealing in fish byproducts, suppliers (of machinery, equipment, and packing materials), and cold-storage and transport firms; a list of trade marks; and a classified guide for buyers. An unusual feature is photographic plates showing 9 stamps with fish designs issued by Vietnam and the Maldive Islands.

DOLPHINS:

"Microvibrations in man and dolphin," by Manfred Haider and Donald B. Lindsley, Science, vol. 146, no. 3648, Nov. 27, 1964, pp. 1181-1183, illus., printed, single copy 35 cents. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D. C. 20005.

ELECTRICAL FISHING:

"Applications de la pêche électrique a la récolte d'animaux pour aquariums" (Application of electrical fishing methods in collecting animals for aquariums), by Pierre Lamarque, article, Ier Congres International d'Aquariologie, vol. D, pp. 109-115, printed in French with German and English summaries, 1963. Musee Oceanographique, Monaco-Ville, Monaco.

FATTY ACIDS:

"A comparative study on fatty acid composition of shellfish," by Y. Shimma and H. Taguchi, article,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Bulletin of the Japanese Society of Scientific Fisheries, vol. 30, 1964, p. 153, printed in Japanese. Japanese Society of Scientific Fisheries, Shiba-Kaigandori 6, Minato-ku, Tokyo, Japan.

"The effect of environmental temperature on the fatty acid composition of crustacean plankton," by Tibor Farkas and Sandor Herodek, article, Journal of Lipid Research, vol. 5, July 1964, pp. 369-373, printed. University Publishers, Inc., 59 E. 54th St., New York, N. Y. 10022.

"Fatty acid composition of vitamin A ester contained in fish liver oil," by T. Kinumaki, H. Taguchi, and K. Iwasaki, article, Chemical Abstracts, vol. 59, 1963, col. 15506, printed. The American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

FISH-LIVER OIL:

"Some nutritional aspects of cod liver oil. I--Its essential fatty acid and hypocholesterolaemic activity," by S. A. Reed, article, Journal of the Science of Food and Agriculture, vol. 15, June 1964, pp. 399-407, printed. Society of Chemical Industry, 14 Belgrave Sq., London SW1, England.

FISH MEAL:

Fish Meal Bag Material vs. Spontaneous Heating, Progress Report No. 73, 4 pp., illus., printed, 1964. Fishing Industry Research Institute, University of Cape Town, Rondebosch, Cape Province, Republic of South Africa.

"Fish oil-solvent-water system examined for the foundation of the preparation of fatless fish meal," by K. Suzuki and K. Saruya, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 30, 1964, p. 37, printed in Japanese. Japanese Society of Scientific Fisheries, Shiba-Kaigandori 6, Minato-ku, Tokyo, Japan.

"Herring meal, antioxidants and the quality of meat--results of feeding experiments," by H. Astrup, H. Hvidsten, and L. Aure, article, News Summary, no. 15, Sept. 1964, pp. 54-64, processed in English with French, Spanish, and German summaries, limited distribution. International Association of Fish Meal Manufacturers, 70 Wigmore St., London W1, England.

"The influence of solvent extracted fish meal and stabilized fish oil in broiler rations on performance and on the flavor of broiler meat," by J. O. Hardin, J. L. Killigan, and Virginia D. Sidwell, article, Poultry Science, vol. 43, July 1964, pp. 858-860, printed. Poultry Science Association, Kansas State College, Manhattan, Kans.

"Pepsin digestibility as an index of quality in fish meal. Part II--Some British studies," by J. A. Lovern, June Olley, and R. Pirie; "Some South African studies," by G. M. Dreosti, S. G. Wiechers, and W. J. Conradie, articles, Fishing News International, vol. 3, no. 4, Oct.-Dec. 1964, pp. 310, 312, 314-316, 318, illus., printed, single copy 6s. 6d. (about 95 U. S. cents). Arthur J. Heighway Publications, Ltd., Ludgate House, 110 Fleet St., London EC4, England. The British studies concluded that the sensitivity of the pepsin digestibility test can be greatly increased by drastic reduction in the strength of the pepsin solution, that is, to one thousandth of the standard in the AOAC (Association of Official Agricultural Chemists) method. Also, it is only possible to compare different types of fish meal by this test when allowance is made for the varying content of water-soluble nitrogenous material. Such "corrected" pepsin digestibilities appear to show a reasonable correlation with available lysine values. The South African studies showed that a crude relationship was found to exist in the practical application between available lysine and a function of digestibility and solubility of fish meal.

FISH OIL:

"Refining of crude commercial sardine oil," by D. P. Sen and others, article, Food Science, vol. 12, 1963, p. 189, printed. Central Food Technological Research Institute, Mysore, India.

FISH PROTEIN CONCENTRATE:

"Fish flour in replacement of dry buttermilk and soybean meal in starter rations for pigs," by J. C. Hillier, Ray Washam, and Lynn Byram, article, Feedstuffs, vol. 36, Aug. 22, 1964, pp. 58-59, printed. Miller Publishing Co., 2501 Wayzata Blvd., Minneapolis 5, Minn.

The following articles appeared in News Summary, no. 15, Sept. 1964, processed in English with French, German, and Spanish summaries, limited distribution. International Association of Fish Meal Manufacturers, 70 Wigmore St., London W1, England:

"An assessment of nutritive value of fish flour in the treatment of convalescent Kwashiorkor patients," by P. J. Pretorius and A. S. Weymeyer, pp. 98-114.

"United Nations Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas--Fish flour production in Sweden," by Bo Hallgren, pp. 30-35.

FISH STOCKS:

"Biological aspects, their influence on future supplies," by H. A. Cole, article, Chemistry and Industry, no. 29, July 18, 1964, pp. 1293-1295, printed. Society of the Chemical Industry, 14 Belgrave Sq., London SW1, England.

FLORIDA:

Algunos Observaciones Preliminares Relacionadas con el Estudio de los Problemas de Venta de Pescado en la Florida (Some Preliminary Observations Related to the Study of the Problems of the Sale of Fish in Florida), by H. C. Osterbind, Serie: Trabajos de Divulgacion, vol. X, no. 91, 13 pp., processed in Spanish, Sept. 1964. (Translated from the English, Department of Economics and Commercial Studies, University of Florida.) Departamento de Estudios Biologicos Pesqueros, Direccion General de Pesca e Industrias Conexas, Secretaria de Industria y Comercio, Mexico, D. F.

FOOD AND AGRICULTURE ORGANIZATION:

The Food and Agriculture Organization has published reports describing that Agency's activities under the Expanded Program for Technical Assistance for developing the fisheries of many countries. These reports have been processed only for limited distribution to governments, libraries, and universities. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Report to the Government of the Federation of South Arabia on Tuna Longlining in the Gulf of Aden, by Tatsuso Suzuki, ETAP Report No. 1844, 31 pp., 1964.

First Report to the Government of Thailand on Fishing Boats, by Peter S. Hatfield, ETAP Report No. 1846, 95 pp., 1964.

Informe al Gobierno del Ecuador sobre Mejoramiento de los Metodos de Pesca y Mecanizacion de las Pesqueras Embarcaciones de Pesca Costera (Report to the Government of Ecuador on the Improvement in the Fishing Methods and Mechanization of the Fishing Vessels in the Coastal Fishery), by Erling Oswald, ETAP Report No. 1857, 40 pp., 1964.

Report to the Government of Libya on Fishery Administration and Planning, by Joseph J. Asciak, ETAP Report No. 1858, 18 pp., 1964.

FRANCE:
"Situation et perspectives de la pêche maritime" (Status and prospects of the marine fishery), article, La Pêche Maritime, vol. 43, no. 1040, Nov. 1964, pp. 781-783, illus., printed in French, single copy 14 F (about US$2.85). Les Editions Maritimes, 190 Blvd. Haussmann, Paris, France.

FREEZE-DRYING:
"Freeze-drying faces the future," by Roy V. Hughson, article, Chemical Engineering, vol. 71, July 20, 1964, pp. 155-160, printed. McGraw-Hill Publishing Co., Inc., 330 W. 42nd St., New York, N. Y. 10036.

FREEZING:
"Nitrogen extends horizons of freezing technology," article, Frosted Food Field, Aug. 1964, p. 14, printed. Frosted Food Field, 321 Broadway, New York, N. Y. 10007.

FRESH-WATER FISH:
The following articles are from Referativnii Zhurnal-Biologiia, 1963. Akademiia Nauk SSSR, Nauchnoi-Informatsii, Moscow, U.S.S.R.:

"Formirovanie rybnykh zapasov v vodokhranilishchakh SSSR" (Formation of fish stocks in USSR reservoirs), by P. A. Dryagin, No. 8187, printed in Russian.

"Osobennosti formirovaniya zapasov promyslovykh ryb v Volgogradskom vodokhranilische" (Characteristics of formation of stocks of commercial fish in the Volgograd reservoir), by A. N. Yakovleva, No. 8191, printed in Russian.

FROZEN FISH:
"Manipulacao de peixe congelado" (Handling of frozen fish), by A. R. Prater, article, Boletim de Estudos de Pesca, vol. 3, no. 6, June 1963, pp. 19-23, printed in Portuguese. Boletim de Estudos de Pesca, Rio de Janeiro, Brazil.

GEAR:
"New purse seine hauling system," article, World Fishing, vol. 13, June 1964, pp. 37-38, printed. John Trundell & Partners Ltd., St. Richard's House, Eversholt St., London NW1, England.

Technical Terms in Fishing Gear Materials and Gear Fabrication, by P. K. Eapen, 32 pp., illus., printed. (Reprinted from Fishery Technology, vol. 1, no. 1.) Government of India, Offshore Fishing Station, Cochin-5, India.

The following articles are from Pacific Fisherman, vol. 62. Miller Freeman Publications, 71 Columbia St., Seattle 4, Wash.:

"Iceland: world's first purse seiner with active rudder and bow-thruster," by W. Nitter Egenaes, July 1964, pp. 13-15.

"Robbie's hydraulic boom handles crab pots easily," Aug. 1964, pp. 22-23.

GEORGIA:
The following reports are published by Governor's Commission for Efficiency and Improvement in Government, Atlanta. Ga.:

The Georgia Game and Fish Department; Its Management and Operations, 26 pp., printed, 1964.

Management and Operations of the Georgia Game and Fish Department, by Seth Gordon, 113 pp., printed, 1964.

GHANA:
The following articles are from Fisheries Research Report, vol. 1, no. 2, 1962. Fisheries Inspectorate Unit, Accra, Ghana:

"Report on fitting outboard motors to Ghanaian fishing canoes (April 1959)," by G. C. Rawson, pp. 1-7.

"Report on population and earnings survey of Faana fishing villages of Accra (February-March 1961)," by H. S. Dua, pp. 8-26.

HALIBUT:
Halibut Preying on Large Crustacea, by George W. Gray, Jr., 1 p., illus., printed. (Reprinted from Copeia, no. 3, Sept. 10, 1964, p. 590.) American Society of Ichthyologists and Herpetologists, 18111 Nordhoff St., Northridge, Calif.

HAWAII:
Hawaii Marine Laboratory, University of Hawaii, by Albert H. Banner, Contribution No. 191, 3 pp., illus., printed. (Reprinted from American Zoologist, vol. 3, no. 3, Aug. 1963.) American Society of Zoologists, 104 Liberty St., Utica, N. Y. Discusses the history of the Laboratory and its administration; use by scientific researchers; and its ideal geographical location. Also discusses research on the biology of reef and inshore animals, current studies on systematics, embryology, ecology, behavior, and physiology of both invertebrates and fish; and programs with national-agency support including studies on toxicity of marine fish, ecological succession on submarine lava flows, investigation of trophic levels by means of isotopic tracers, and studies in marine parasitology. Also covers laboratory facilities at the Waikiki and Coconut Island laboratories, planned additional facilities, Laboratory publications, and collection of local marine animals.

HERRING:
"Chemical studies on the herring (Clupea harengus). X--Histidine and free sugars in herring flesh," by

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R. B. Hughes, article, Journal of the Science of Food and Agriculture, vol. 15, May 1964, pp. 293-299, printed. Society of Chemical Industry, 14 Belgrave Sq., London SW1, England.

"Osobennosti raspredeleniya i sostoyanie chislennosti bankovykh sel'dei Severnogo morya v 1959 g." (Distribution characteristics and numerical abundance of the bank herring of the North Sea in 1959), by N. I. Skornyakov, article, Trudy Baltiiskogo Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khoziaistva i Okeanografii, vol. 7, 1961, pp. 50-58, printed in Russian. Trudy Baltiiskogo Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khoziaistva i Okeanografii, Verkhn. Krasnosel'skaia U1. No. 17, Moscow, U.S.S.R.

"Oxygen uptake of developing eggs and larvae of the herring (Clupea harengus)," by F. G. T. Holliday, J. H. S. Blaxter, and Reuben Lasker, article, Journal of the Marine Biological Association of the United Kingdom, vol. 44, no. 3, Oct. 1964, pp. 711-723, illus., printed, single copy $13.50. Cambridge University Press, 32 E. 57th St., New York, N. Y. 10022.

"Zavisimost'srokov neresta salaki ot ee plodovitosti" (Relationship of spawning time to fecundity in Baltic herring), by M. N. Krivobok, article, Trudy Vsesoiuznyi Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khoziaistva i Okeanografii, vol. 44, 1961, pp. 160-164, printed in Russian. Institut Morskogo Rybnogo Khoziaistva i Okeanografii, Verkhn. Krasnosel'skaia U1. No. 17, Moscow, U.S.S.R.

The following English translations from the Russian, Soviet Fisheries Investigations in North European Seas, 1960, are available from the Fisheries Laboratory, Ministry of Agriculture, Fisheries and Food, Lowestoft, Suffolk, England:

The Distribution and Migrations of Summer Spawning Herring in the Norwegian Sea, by K. A. Lyamin, Translation No. N. S. 50, 6 pp., illus., printed, 1964.

The Dynamics of the Biological Condition of the Atlanto-Scandian Herring during the Summer Period, by D. A. Shubnikov, Translation No. N. S. 46, 10 pp., illus., printed, 1964.

Features of the Distribution, Growth, and Maturation of Herring of Certain Year-Classes in the Barents Sea, by L. V. Shutova-Korzh, Translation No. N. S. 49, 10 pp., printed, 1964.

Migrations of the Atlanto-Scandian Herring, by Yu. Yu. Marti, Translation No. N. S. 45, 11 pp., illus., printed, 1964.

Soviet Investigations Concerning Spawning Grounds of the Atlanto-Scandian Herring, by I. G. Yudanov, Translation No. N. S. 48, 18 pp., printed, 1964.

ICHTHYOLOGY:

Nomenclatura Ictiologica; Nombres Cientificos y Vulgares de los Peces Españoles (Ichthyological Nomenclature; Scientific and Common Names of Spanish Fish), Trabajos No. 31, 271 pp., printed in Spanish, 1963. Instituto Espanol de Oceanografia, Ministerio de Marina, 27 Alcalá, Madrid, Spain.

INDIA:

Gujarat Fisheries Central Co-Operative Association, Ltd., Annual Report, 1962/63, 1 vol., printed. Gujarat Fisheries Central Co-Operative Association, Ltd., Ahmedabad, India.

INDUSTRIAL PRODUCTS:

Un Desafio a la Industria de Harinas y Aceites de Pescado en el Golfo de Mexico (A Challenge to the Fish Meal and Oil Industry of the Gulf of Mexico), by John W. Reintjes and Fred C. June, Serie: Trabajos de Divulgacion, vol. VIII, no. 75, 14 pp., processed in Spanish, Nov. 1963. (Translated from the English, Proceedings of the Gulf and Caribbean Fisheries Institute, Thirteenth Annual Session, Nov. 1960, pp. 62-66.) Departamento de Estudios Biologicos Pesqueros, Direccion General de Pesca e Industrias Conexas, Secretaria de Industria y Comercio, Mexico, D. F.

"Price recovery registered in industrial fisheries product market," by Clarence F. Winchester, article, Fishing Gazette, vol. 81, no. 13 (1964 Annual Review Number), pp. 112, 114-115, 183, printed. Brown & Ross, Inc., 17 Battery Pl., New York, N. Y. 10004.

Photocopies of the following patents may be obtained from the International Association of Fish Meal Manufacturers, 70 Wigmore, St., London W1, England:

"Process of Manufacture and Sterilisation of Meat Meals and Fish Meals," by C. Jouandel and A. Duval, French Patent 1,313,225, printed in French, Nov. 19, 1964.

Process for Treating Oil-Containing Animal Material, such as Fish and Fish Offal, by H. M. Ehlert, United States Patent 3,041,174, printed in English, June 26, 1962.

Apparatus for Sterilising Fish Meal or Meat Meal, by R. Christiansen, German Patent 1,132,788, printed in German, July 5, 1962.

Process for Sterilising Fish Meal or Meat Meal, by R. Christiansen, German Patent 1,134,574, printed in German, Aug. 9, 1962.

Process for Solvent Recovery from the Miscella Obtained in the Extraction of Fish Pulp or Fish Meal with a Water-Soluble Organic Solvent, such as Ethyl Alcohol, by E. Fleming and R. Druger, German Patent 1,136,895, printed in German, Sept. 20, 1962.

Production of Fish Protein, by R. J. Moshy, Canadian Patent 663,559, printed in English and French, May 21, 1963.

INSPECTION:

Regulations Governing the Inspection of Canned Fish and Shellfish and the Operation of Canneries, 41 pp., processed, Oct. 1964. Department of Fisheries, Ottawa, Canada. These regulations, cited as the canned fish and shellfish inspection regulations, cover interpretation of terms, general provisions, labeling, chicken haddie or flaked fish, clams and mussels, crabs, finnan haddie, gaspereau, herring, lobster, mackerel, pollock, salmon (Atlantic), salmon (Pacific), sardines, shad, shrimp cocktail, and tuna. Requirements for each species are designated under fancy, standard, and commercial grades.

Regulations Respecting the Inspection of Processed Fish and Processing Establishments, 44 pp., processed, Oct. 1964. Department of Fisheries, Ottawa, Canada.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

These regulations, cited as the fish inspection regulations, cover interpretation of terms, general provisions, labeling, pickled fish, smoked fish, salted fish, fresh and frozen fish, smelts, oysters, scallops, breaded fish, and whitefish. Also included are Schedule A--requirements for pickled, marinated, salted, and smoked fish plants; Schedule B--construction and equipment requirements for fresh and frozen fish-processing establishments; Schedule C--operating requirements for fresh and frozen fish-processing establishments; and Schedule D--requirements for establishments storing frozen fish.

IRRADIATION PRESERVATION:

"Food preservation by ionizing radiations. I--The combined effects of ionizing radiation and smoking on fish meat preservation," by Byung Sun Cnung, article. Bulletin of Fisheries College, Pusan National University, vol. 5, Sept. 1963, pp. 45-51, printed. Fisheries College, Pusan National University, Pusan, Korea.

JAPAN:

Bulletin of the Faculty of Fisheries, Nagasaki University, no. 17, Sept. 1964, 144 pp., illus., printed in Japanese with English summaries. The Faculty of Fisheries, Nagasaki University, Nagasaki, Japan. "Studies on a marine viviparous teleost, Ditrema temmincki Bleeker. IV--On the origin of oocystes of Ditrem temmincki, Sebastiscus marmoratus and Sebastes inermis," by Kazuhiro Mizue; "Studies on the little toothed whales in the west sea area of Kyusyu. X--About Prodelphinus sp. so-called 'Hashinaga-iruka' in Japan caught in the sea area around Goto Is., Nagasaki Pref.," by Kazuhiro Mizue, Kazumoto Yoshida, and Seizaburo Sonoda; "Analysis of fish-finder records. V--On winter shrimp trawl in the Yellow Sea (1)," by Deishi Shibata; "Freeze-preservation of Porphyra thalli in viable state. I--Viability of Porphyra tenera preserved at low temperature after freezing in the sea water and freezing under half-dried conditions; "Studies on Penaeus orientalis Kishinouye. I--Seminal mechanism and its function," by Masao Oka and Soichiro Shirahata; "Studies on the little toothed whales in the west sea area of Kyushu. XI--On the fatty alcohols of head oils from a porpoise and some dolphins," by Ryoiti Kanazu and Tadanobu Fukuhara; and "Studies on the decree of fishery-ground in Meiji," by Shigeshi Aotuka.

The Canners Journal, vol. 43, no. 10 (special statistical issue), 1964, 160 pp., illus., printed in Japanese. Japan Canners Association, Tokyo, Japan. Presents, in addition to articles of interest to the canning and food industries, statistical tables on shifts in production and exports of canned foods in Japan, 1954-63; shifts in consumption of canned foods, 1957-63; production of canned foods, actual and standard cases, 1948-55; exports of canned foods, actual and standard cases, 1948-55; and production of canned foods by kinds and can-types (round cans), Jan.-Dec. 1963. Also includes data on production of canned fishery products by prefectures, Jan.-Dec. 1963; exports of major canned foods by destinations, Jan.-Dec. 1963; exports and value of canned foods, 1959-63; wholesale prices of major marine products for 1963; catches of major fishery products, 1959-63; catches of whales, 1959-63; and production of tinplate by major Japanese manufacturers.

Japanese Fisheries Resource Conservation Association Major Activities in FY 1963, 24 pp., printed, Oct. 1964. Japanese Fisheries Resource Conservation Association, c/o Futaba Bldg., 24, Nishikubo, Sakuragawa-cho, Minato-ku, Tokyo, Japan.

Statistic Tables of Fishing Vessels (as of the End of 1963), General Report No. 16, 309 pp., printed in Japanese and English. Japanese Fisheries Agency, Tokyo, Japan. An annual report containing statistical data in detail on the various types of Japanese fishing craft, both powered and nonpowered, as obtained by a fishery registration system.

The following issues are published by Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba Kaigandori 6, Minato-ku, Tokyo, Japan:

Bulletin of the Japanese Society of Scientific Fisheries, vol. 30, no. 7, July 1964, 75 pp., illus., printed in Japanese with English summaries. Contains, among others, articles on: "A transient glucosuria (Diabetes Mellitus) of rainbow-trout (Salmo irideus) induced by bovine growth hormone injection," by Yoshimasa Enomoto; "A preliminary experiment on the growth promoting effect of growth hormone with thyroid-stimulating hormone and prolactin to the young rainbow-trout (Salmo irideus)," by Yoshimasa Enomoto; "Studies on the oil pollution of the fishing ground in Seto Inland Sea. I--Distribution of oily wastes in the Sea," by Hitomi Sugimoto, Masaya Suzuki, and Osamu Takeuchi; "Frequency distribution of hauls by the Danish seiners in the Bristol Bay with respect to catch in tons," by Hiroshi Maeda and Shiro Minami; "On the cause of annual variation of fishing condition of big-eyed tuna in the area from Marshall Islands to Palmyra Island. VI--Relation between longline catch-rate and dominant age group and year the dominant age group was spawned," by Jun Nakagome; "Preparation of fatless fish meal by solvent extraction," by Kosaku Suzuki and Kuman Saruya; "Quality of Kombu, one of the edible seaweeds, belonging to the Laminariaceae. VIII--Conditions for extraction of total and amino-nitrogens with aqueous ethanol," by Ayako Okumura, Keiichi Oishi, and Kiichi Murata; and "A simple method for the determination of metmyoglobin content in tuna meat," by Kazuo Ando.

Bulletin of the Japanese Society of Scientific Fisheries, vol. 30, no. 8, Aug. 1964, 120 pp., illus., printed in Japanese with English summaries. Includes, among others, these articles: "Granographical life record curve method for identifying each stock of pelagic fishes. VII--Identification of sardine stocks in coastal waters of Japan, 1938-48," by Hideaki Yasuda; "Egg development and prolarval stages of the turbot, Pleuronichthys cornutus (Temminck et Schlegel)," by Toru Takita and Shiro Fujita; and "Studies on fishing conditions of the dolphin, Coryphaena hippurus L., in the western regions of the Sea of Japan. IX--Quantitative analysis on stomach contents," by Shumpei Kojima; and "Distribution pattern of groundfishes hooked along a row of setline in the shallower part of the continental slope in the Bering Sea. III--Distribution near the outer edge of the continental shelf," by Hiroshi Maeda.

Bulletin of the Japanese Society of Scientific Fisheries, vol. 30, no. 9, Sept. 1964, 95 pp., illus., printed in Japanese with English summaries. Includes, among others, these articles: "Studies on reproduction of rainbow trout, Salmo gairdneri, with special reference to egg taking. VI--The activities of spermatozoa

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

in different diluents, and preservation of semen," by Minoru Nomura; "On the population and migration of adult red salmon in the western parts of the North Pacific and Bering Sea, as estimated by age composition," by Akira Ochiai and Toranosuke Yoshimitsu; "Studies on the propagation of abalone, Haliotis diversicolor supertexta Lischke. I--On the spawning habits," by Toshio Oba; "Studies on the antisepsis for agar during the manufacturing process in the mild winter. XI--On the causative bacteria on the 'Dankan' phenomenon, the spoilage of 'Tokoroten' and agar," by Hiroaki Fujisawa; "Studies on the behavior and the effect of some preservatives in fish products. I--Behavior of tylosin in fish products on the basis of antibacterial action," by Motonobu Yokoseki and others; "Distribution of Vibrio parahaemolyticus in plankton and fish in the open sea," by Susumu Horie and others; and "Denaturation of fish muscle proteins by freezing," by Taneko Suzuki.

KELP:

"Harvesting brown kelp--new industry for Tasmania," by P. C. Pownall, article, Fisheries Newsletter, vol. 23, no. 11, Nov. 1964, pp. 11, 13, 15, illus., printed. Fisheries Branch, Department of Primary Industry, Canberra, Australia. Extensive beds of giant brown kelp (Macrocystis pyrofera), which a 1950 survey indicated could yield approximately 355,000 tons of wet weed a year, form the basis of a new alginates industry established on the East Coast of Tasmania. The kelp will be processed at a modern plant near the fishing port of Triabunna, and planned production is adequate to meet Australian requirements. Brown kelp is a natural source of sodium alginate (in its pure form a white powder) for which there is a worldwide demand. Alginates are used primarily in foods, pharmaceutical and cosmetic preparations, and in a variety of industrial products. Alginic acid is an unusual compound found only in brown seaweeds. It is used as a thickening agent in foodstuffs, medicines, and textile printing.

KOREA:

Korean Inspection Laws of Fishery Products (A Guide for Foreign Traders and Distributors), Inspection Service Series No. 1, 15 pp., illus., printed, 1964. Central Fisheries Inspection Station, Ministry of Agriculture and Forestry, 103 Wunnam-Dong, Congro-Ku, Seoul, Korea. Contains information on development of the Korean fishery products inspection system; types of inspection performed--continuous inspection, each piece inspection, and random sampling inspection; organization and functions of the Central Fisheries Inspection Station; text of the fishery products inspection law of 1962; other decrees and ordinances pertaining to fishery products inspection; and a copy of the inspection certificate.

LIVESTOCK NUTRITION:

"The nutrition of the early-weaned calf. VII--The relative value of four different fish meal products as the major protein source in the diet," by F. G. Whitelaw, T. R. Preston, and N. A. MacLeod, article, News Summary, no. 15, Sept. 1964, pp. 90-98, processed in English with French, German, and Spanish summaries, limited distribution. International Association of Fish Meal Manufacturers, 70 Wigmore St., London W1, England.

LOBSTERS:

"The economics of lobster fishing," by R. D. Leakey, article, Fishing News, no. 2688, Dec. 11, 1964, pp. 6, 7, illus., printed, single copy 9d. (about 15 U. S. cents). Arthur J. Heighway Publications Ltd., 110 Fleet St., London EC4, England. "The yardstick of efficient fishing is simply how much a lobster fisherman earns an hour for his effort... . In terms of value for labor, therefore, it is more efficient to buy pots than to make them even when there is as big a difference as £2 (US$5.60) to set against the bought pots... . Incidentally, a pot for quick fishing must have a large, easy entrance--which all too often is also an easy exit... . Slow moving shellfish are best caught profitably with a large number of pots left down for as long as the bait can be kept fresh and in place... . Just how important the cost of your gear is in relation to time, is only appreciated when you work out how soon a lobster pot pays for itself in value of caught lobsters," states the author. He suggests the use of a power-driven pulley on the vessel to assist in servicing pots more rapidly and thus more economically.

"Quality changes in vacuum-packed and nonvacuum-packed frozen lobster meat during storage at different temperatures," by W. A. Murphy and H. L. Newson, Canadian Fisheries Report, no. 2, 1963, pp. 29-32, printed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada.

A Study of the Hatching Process in Aquatic Invertebrates, XIII--Events of Eclosion in the American Lobster, HOMARUS AMERICANUS Milne-Edwards (Astacura, Homaridae), by Charles C. Davis, Contribution No. 2, 8 pp., illus., printed. (Reprinted from The American Midland Naturalist, vol. 72, no. 1, July 1964, pp. 203-210.) Division of Marine Fisheries, Massachusetts Department of Natural Resources, 15 Ashburton Pl., Boston 8, Mass.

MARINE AIDS:

Light List, Vol. III--Pacific Coast and Pacific Islands, 303 pp., illus., printed, 1964, $2. U. S. Coast Guard, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Contains a list of lights, fog signals, buoys, daybeacons, lightships, radiobeacons, and loran stations for the Pacific Coast and Pacific Islands.

MARINE BORERS:

El Teredo (The Teredo), by Charles E. Lane, Serie; Trabajos de Divulgacion, vol. VIII, no. 76, 14 pp., illus., processed in Spanish, Nov. 1963. (Translated from the English, Scientific American, vol. 204, no. 2, Feb. 1961.) Departamento de Estudios Biologicos Pesqueros, Direccion General de Pesca e Industrias Conexas, Secretaria de Industria y Comercio, Mexico, D. F.

MARINE ENGINES:

"Selection of marine engines under 50 hp.," by E. Kvaran, article, Fishing News International, vol. 3, Apr.-June 1964, pp. 48-59, printed. Arthur J. Heighway Publications, Ltd., Ludgate House, 110 Fleet St., London EC4, England.

MARINE MAMMALS:

Notas sobre Mamiferos Acuaticos (Notes on Aquatic Mammals), by Daniel Lluch Belda, Serie Trabajos de

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Divulgacion, vol. IX, no. 85, 10 pp., processed in Spanish, June 1964. Departamento de Estudios Biologicos Pesqueros, Direccion General de Pesca e Industrias Conexas, Secretaria de Industria y Comercio, Mexico, D. F.

MASSACHUSETTS:

Following issued by Commonwealth of Massachusetts, Department of Natural Resources, Division of Marine Fisheries, 15 Ashburton Pl., Boston 8, Mass.:

Blueprint for Tomorrow, by Hal Lyman, 4 pp., illus., printed. (Reprinted from Salt Water Sportsman.) In Massachusetts, sport and commercial fisheries interests join forces to chart a modern approach to ancient problems.

Report Relative to the Coastal Wetlands in the Commonwealth, and Certain Shellfish Grants (under Chapter 75 of the Resolves of 1962), Document No. 635, 22 pp., printed, 1963.

Division of Marine Fisheries, Annual Report, Fiscal Year July 1, 1962-June 30, 1963, 74 pp., illus., processed, Sept. 1, 1963. Discusses accomplishments of the Division of Marine Fisheries during 1962/63 in marine fisheries administration; Marine Fisheries Advisory Commission; lobster fishery statistics; sea crab fishery; shore, net, and crab fishery; Massachusetts landings; commercial permits and certificates; sport fishing survey; and present status of proposed legislation affecting marine fisheries in 1963. Also covers research and management work in lobster research, lobster measurements, shellfish work, coastal wetlands study, finfish, estimate of the volume of alewife fishery, alewife propagation 1963, flounder tagging summary, and Newburyport Shellfish Purification Plant. In addition, covers shellfish production for 1962, summary of diggers, appraisal of coastal or marine engineering projects, sanitation program, detergents and cleansing agents approved by the Director of Marine Fisheries, and Estuarine research program. Also includes a progress report relative to the management of the blackback flounder fishery in Massachusetts.

General Laws Relating to Marine Fish and Fisheries, Chapter 130, As Amended Through 1963 (Special Laws on Torching, Dragging and Other Marine Fisheries Subjects Not Included), 45 pp., printed. Includes State laws covered under general provisions; miscellaneous powers and duties of Director, coastal wardens, etc., pollution of coastal waters; riparian proprietors; regulation of fish weirs, nets, seines, trawls, and traps; annual reports of catches; smelt; lobsters, etc.; local control of shellfisheries; private shellfish grants; certain shellfish; shellfish in contaminated areas; purification plants; commercial permits and certificates; inspection of fish; herring, alewives, etc.; and miscellaneous provisions such as minimum length for fish taken from coastal waters.

Special Report of the Department of Natural Resources Relative to Restricting the Use of Beam or Otter Trawls, the Appointment, Powers and Duties of Shellfish Constables, the Control and Eradication of Dogfish, the Taking of Lobsters, and the Enforcement of Certain Laws Relative to Fish by Local Police, Under Chapter 43 of the Resolves of 1963, 141 pp., illus., printed, 1964. Contains Minutes of the Marine Fisheries Advisory Commission Public Hearing, Gloucester, Mass., May 22, 1963; a report on a suit brought by the Commonwealth against defendants charged with violating the Acts which prohibit the use of otter trawls in certain parts of the territorial waters; study of the groundfisheries; value of groundfish caught during the study; silver hake study; the line trawl fishery study; report of dragging on bottom life and on the bottom; and report on the study area as the spawning and nursery grounds for species of sports and commercial importance. Also includes a study of the lobster fishery; proposed legislation relative to taking fish by otter trawl in certain coastal waters; statement submitted by Gloucester Fishermen's Cooperative Association pertaining to use of otter trawls; an Act authorizing and directing the Division of Marine Fisheries to establish and maintain a dogfish nuisance control and eradication program; an Act relative to the taking of lobsters; an Act permitting local police officers to enforce certain laws relative to fish and their authority in relation thereto; and an Act relative to the appointment of a shellfish constable or shellfish supervisor and his duties and powers.

MEXICO:

La Isla de Guadalupe, Mexico. Contribucion al Conocimiento de sus Recursos Naturales Renovables (The Island of Guadalupe, Mexico. Contribution to the Knowledge of Its Renewable Natural Resources), by Julio Berdegue A., 80 pp., illus., printed in Spanish, 1957. Direccion General de Pesca e Industrias Conexas, Secretaria de Marina, Mexico, D. F.

"Mexico's fisheries projects could mean Canadian sales," by J. E. G. Gibson, article, Foreign Trade, vol. 122, no. 7, Oct. 3, 1964, pp. 26-28, illus., printed, single copy 25 Canadian cents. Queen's Printer, Government Printing Bureau, Ottawa, Canada. Millions of dollars are being spent on modernizing and expanding Mexico's fishing industry--much of it on new equipment that Canadian manufacturers could supply, according to the author. Mexico's plans to modernize its fisheries include: establishing marine biological research stations; exploring and charting the coastline; training workers in all aspects of the fishing industry; opening a fish meal plant at Alvarado late in 1964; providing loans for the fishing cooperatives to help them increase their fleets and improve their facilities; building a pilot fishing port on the Gulf of Mexico with a five-boat, all-purpose fleet, wharves and channels, processing plants, and research facilities; and sponsoring a travelling exhibition of the country's sea resources, the Salon del Mar, as part of a program to encourage Mexicans to eat more fish.

The following reports, processed in Spanish, are issued in the Serie: Trabajos de Divulgacion, and are available from the Departamento de Estudios Biologicos Pesqueros, Direccion General de Pesca e Industrias Conexas, Secretaria de Industria y Comercio, Mexico, D. F.:

Condiciones que guarda el aprovechamiento de los Recursos Pesqueros en los Estados de Tabasco, Chiapas y Porcion Istmica de Oaxaca y Veracruz (Conditions

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which Assure the Utilization of the Fisheries Resources of the States of Tabasco, Chiapas, and the Isthmian Portion of Oaxaca and Veracruz), by Aurelio Solorzano P., vol. VIII, no. 72, 33 pp., illus., Oct. 1963.

Informe sobre la Situacion Pesquera del Estado de Oaxaca. Apuntes para la Programacion de ese Renglon Economico Estatal (Report on the Fishery Situation in the State of Oaxaca. Memoranda on the Planning of this item in the State Economy), by Aurelio Solarzano Preciado, vol. VIII, no. 74, 41 pp., Oct. 1963.

Investigaciones Pesqueras en el Pacifico (Fishery Investigations in the Pacific), by Cardenas Figueroa, vol. VII, no. 63, 38 pp., illus., June 1963.

Prospeccion Pesquera en Avion (Fishery Exploration by Airplane), by Hector Chapa Saldana, vol. II, no. 20, 17 pp., illus., Oct. 1961.

Proyecto de Fomento Pesquero para Ayudar a la Rehabilitacion Economica de la Tribu Seri (Fishery Development Project to Help in the Economic Rehabilitation of the Seri Tribe), by Rodolfo Ramirez Granados, vol. III, no. 26, 18 pp., June 1962.

Usion Biologico Pesquera y Conservacion (Uses of Fishery Biology and Conservation), by Mauro Cardenas Figueroa, vol. VI, no. 56, 21 pp., May 1963.

MILT:

"Growth inhibitory effect of extracts from milt (testis) of different fishes and of pure protamines on microorganisms," by Olaf R. Braekkan and Gjermund Boge, article, Fiskeridirektoratets Skrifter Serie Teknologiske undersokelser, vol. 4, no. 6, 1964, 22 pp., printed. Fiskeridirektoratet, Bergen, Norway.

MINK RATIONS:

"Feeding with herring waste. Trials on the use of herring waste in mink feeding," by K. S. Thomsen, article, Dansk Pelsdyravl, vol. 26, 1963, p. 431, printed in Danish. Dansk Pelsdyravl, Sdeasdy 8, Copenhagen, Denmark.

NORTHWEST ATLANTIC:

Las Pesquerias del Atlantico Noroeste y el Convenio de Washington (The Northwest Atlantic Fisheries and the Washington Convention), by Olegario Rodriguez, 103 pp., illus., printed in Spanish, Dec. 1961. Direccion General de Pesca Maritima, Subsecretaria de la Marina Mercante, Madrid, Spain.

NORTHWEST EUROPE:

Havfisk og Fiskeri i Nordvesteuropa (Ocean Fish and Fisheries in Northwest Europe), by Bent J. Muus and Preben Dahlstrøm, 244 pp., illus., printed in Danish, Nov. 1964, hard cover 38.50 Kr., paperback 29.75 Kr. (about US$5.60 and $4.30). G. E. C. Gad, Vimmelskaftet 32, Copenhagen, Denmark. This beautifully illustrated and excellently written handbook on the fish of the Northeastern Atlantic Ocean is outstanding in the field of popular, semitechnical reference books. Despite the fact it is written in Danish, the illustrations of the fish, their food, their habitat, the gear with which they are taken, and the commercial uses to which the fish are put, are so colorful and clear that any non-Danish reader will get full value for his money, even in the illustrations alone. The accompanying text discusses, in simple terms, the life histories of the fish, where and how they are caught, and many other interesting facts.

The pocket-size book contains illustrations in 6 colors of 173 species of fish. In most instances the large illustration of the mature fish is surrounded by smaller sketches in color of its special characteristics, younger stages, most important food, and the area it inhabits. Also included are the various types of gear and vessels used in its capture, and the end result--an iced, frozen, salted, smoked, canned or otherwise processed or preserved product. The small sketches alone number over 800.

There are nine brief illustrated chapters or sections in addition to the 179 pages devoted to the "Descriptions and Illustrations" of fish. "Portrait of a Fish" describes the skin, scales, organs, senses, colors, form, and swimming. "The Fish's Life" includes schooling, migrations, spawning, development, growth, age, food, plankton and food chains, habitat, and hydrography. "Keys" to the more important groups are so clearly illustrated that identifying a fish belonging to these groups is a simple matter. "History of the Fisheries" briefly touches upon significant events from ancient times to the present. "Fishing Methods" depicts and describes all of the significant types of gear (including a powerblock and an air-bubble curtain) and present day fishing vessels and their electronic equipment. "Utilization of the Fish" explains the usual processing techniques. "Fishery Biology" touches on determination of age and growth, food research, tagging, races and stocks, recruitment, and assessment. "Name Index" includes two alphabetical lists (one of fish names in Danish and one in Latin). "Literature Reference" lists one Swedish, one Norwegian, and three Danish works on fisheries.

The author, Bent Muus, is a biologist at Denmark's Fisheries and Marine Research Institute at Charlottenlund, just north of Copenhagen. The illustrator, Preben Dahlstrøm, has illustrated a number of natural history books. Together they have turned out a work which is an unusual combination of popular appeal, technical information, and the printer's art. It should rank high as a Danish contribution to fishery books.

--A. W. Anderson

NUTRITION:

"The effect of a supplementary protein food containing fish flour, groundnut flour and Bengal gram flour and fortified with vitamins on the growth and nutritional status of children," by T. R. Doraiswany and others, article, Indian Journal of Pediatrics, vol. 30, 1963, p. 266, printed. Indian Pediatric Society, 56/2 Creek Row, Calcutta, India.

OCEANOGRAPHIC EQUIPMENT:

"A hydraulically actuated safety device," by Peter L. Sachs, article, Journal of Marine Research, vol. 22, no. 1, 1964, pp. 105-109, illus., printed. Sears Foundation for Marine Research, Bingham Oceanographic Laboratory, Yale University, New Haven, Conn. Reduces accidental premature operation of oceanographic samplers.

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OCEANOGRAPHY:

A Bibliography of Articles Pertinent to Marine Primary Productivity, compiled by Maxwell S. Doty, TID-3913, 31 pp., processed, Oct. 1963, 75 cents. Division of Technical Information, U. S. Atomic Energy Commission, Washington, D. C. (For sale by the Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.)

"Flip: an oceanographic buoy," by Philip Rudnick, article, Science, vol. 146, no. 3649, Dec. 4, 1964, pp. 1268-1273, illus., printed, single copy 35 cents. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D. C. 20005. Discusses in detail the construction and functions of the large manned spar buoy "Flip" (Floating Instrument Platform) used by the Scripps Institution of Oceanography. Reasonably mobile, it is towable in the horizontal position. When vertical it is an acoustically quiet platform of great stability extending simultaneously to 90 meters below and 17 meters above the sea surface. Once "Flip" was planned, it was evident that she would have important uses beyond the initial project not only for instrumental investigations of the uppermost 90-meter layer of the ocean, but as a more nearly stationary support from which to lower instruments by cable into the deeper layers. The hull, 315 feet (95 meters) long, is joined to a boxlike structure which serves as a bow when the buoy is horizontal and as a superstructure when it is vertical. The superstructure contains, in addition to fuel and freshwater tanks, four compartments which are used in both horizontal and vertical positions and constitute the inhabited part of the buoy. Power for the two air compressors is supplied by two 60 kw. diesel-driven generators. The buoy has no self-propulsion, but is fitted with two propellors mounted near the center of the hull and driven by hydraulic motors which maintain it in any desired position. "Flip" is manned by a crew of seven. Most work thus far has involved her response to wave action.

Oceanographic Cruise USCGC NORTHWIND, Bering & Chukchi Seas, July-Sept. 1962, Oceanographic Report No. 1, CG 373-1, 111 pp., illus., printed, 1964, $1.50. U. S. Coast Guard, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

Oceanographic Observations, North Atlantic Ocean Station Delta, 44°N. 41°W., March-Apr. 1963, by J. W. McGary and R. M. Morse, Oceanographic Report No. 3, CG 373-3, 35 pp., illus., printed, 1964. U. S. Coast Guard, Washington, D. C.

Oceanographic Observations - North Atlantic Ocean Station Echo, 35°N. 48°W., Jan.-Feb. 1963, by R. M. Morse and J. W. McGary, Oceanographic Report No. 2, CG 373-2, 36 pp., illus., printed, 1964. U. S. Coast Guard, Washington, D. C.

"Oceanography: cost-effectiveness technique employed to support case for basic research program," by D. S. Greenberg, article, Science, vol. 146, no. 3652, Dec. 25, 1964, pp. 1659-1660, printed, single copy 35 cents. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D. C. 20005. Discusses a report by the Committee on Oceanography of the National Academy of Sciences-National Research Council supporting the thesis that oceanographic research can be expected to produce an attractive economic return. It concludes that an annual nondefense expenditure of $165 million over the next 10 to 15 years (the current figure is $138 million) could be essential in saving $3 billion a year (principally through conservation practices) and in adding annual production of about another $3 billion. To reach this conclusion, the committee not only took up the obvious matter of fish and minerals; it went even farther afield and estimated that oceanography's contributions to weather forecasting could produce substantial savings for cattle and hog producers.

Oceanography and Marine Biology: an Annual Review, vol. 2, edited by Harold Barnes, 548 pp., printed, 1964, 75s. (about US$10.50). George Allen and Unwin, Ltd., 40 Museum St., London WC1, England.

Second Annual Report, 1963, 16 pp., printed, 1963. Canadian Oceanographic Data Centre, Ottawa, Canada.

OCEAN PERCH:

The following articles are from Rybnoe Khoziaistvo, 1962. Rybnoe Khoziaistvo, V. Krasnosel'skaia 17, B-140, Moscow, U.S.S.R.

"O gruppirovkakh okunya-klyuvacha (Sebastes mentella Travin) v Labradorsko-N'yufaundlendskom raione" (On the stocks of deepwater redfish--Sebastes mentella--in the Labrador-Newfoundland region), by K. P. Yanulov, pp. 285-296, printed in Russian with English summary.

"Razmerno-vozrastnoi sostav okunyaklyuvacha Severo-Zapadnoi Atlantiki" (Size and age composition of Sebastes mentella Travin of the northwestern Atlantic), by E. I. Surkova, pp. 297-311, printed in Russian with English summary.

OYSTERS:

"Louisiana leads in oyster production!" by Lyle St. Amant, article, Louisiana Conservationist, vol. 17, nos. 1 & 2, Jan.-Feb. 1965, pp. 14-17, illus., printed. Louisiana Conservationist, Wild Life & Fisheries Bldg., 400 Royal St., New Orleans, La. 70130. Louisiana produced 20 percent of all the oysters in the United States in 1963, placing her in the number one position. However total production in the United States was down by 11 percent during the five-year period 1959-63. Louisiana has a large oyster-growing area with mostly optimum characteristics for oyster production, but faces many problems in this industry. Predators, pollution, and high salinity are grave dangers to this mollusk. Culture from seed oysters is practiced in many areas. Rapid growth of oysters in warm waters makes it possible for the oysterman to plant seed oysters in the fall and harvest them in the spring.

"Total solids in oysters," by Norman W. Durrant, article, Journal of the Association of Official Agricultural Chemists, vol. 46, Aug. 1963, pp. 744-746, printed. Association of Official Agricultural Chemists, P. O. Box 540, Benjamin Franklin Station, Washington, D. C. 20004.

PACKAGING:

A New Device for Testing the Airtightness of Fish Preserve Packaging, by L. M. Kazakov, Translation No.

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I-4193, 5 pp., printed. (Translated from the Russian, Rybnoye Khozyaystvo, vol. 37, no. 1, 1961.) Headquarters, Dept. of the Army, Office, Assistant Chief of Staff for Intelligence, Washington 25, D. C.

"Packaging requirements for irradiated fishery products," by Louis J. Ronsivalli and John A. Peters, article, Fishing Gazette, vol. 81, no. 13 (1964 Annual Review Number), pp. 134, 136, 138, printed. Brown & Ross, Inc., 17 Battery Pl., New York, N. Y. 10004.

PARASITES:
A Second List of Parasites from Marine and Coastal Animals of Florida, by Robert F. Hutton, 9 pp., printed, 1964. (Reprinted from Transaction of the American Microscopical Society, vol. 83, no. 4, 1964, pp. 439-447.) American Microscopical Society, 50 E. Broad St., Columbus, Ohio.

PITUITARY GLAND:
The Pituitary Gland and Its Relation to the Reproduction of Fishes in Nature and in Captivity, An Annotated Bibliography for the Years 1956-1963, compiled by James W. Atz and Grace E. Pickford, Fisheries Biology Technical Paper No. 37, 65 pp., processed in English with French and Spanish introductions, Apr. 1964. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

PLANKTON:
Apuntes Preliminares sobre Tecnicas Planctonologicas (Preliminary Memoranda on Planktonological Techniques), by Maria Luisa Sevilla, Publicacion No. 9, 30 pp., illus., printed in Spanish, 1964. Instituto Nacional de Investigaciones Biologico Pesqueras, Comision Nacional Consultiva de Pesca, Direccion General de Pesca e Industrias Conexas, Secretaria de Industria y Comercio, Mexico, D. F.

POLAND:
"Sea Fishing Act" (Ustawa o Rybolowstwie Morskim), 21 May 1963; Dziennik Ustaw Polskiej Rzeczypospolitej Ludowej No. 22, 28 May 1963, p. 270, Text 115, Food and Agricultural Legislation, vol. XIII, no. 1, Sept. 1964, Poland, XVI/3, 10 pp., printed, single copy $1. Columbia University Press, International Documents Service, 2960 Broadway, New York, N. Y. 10027. Contains general provisions such as area covered, restriction of fishing to Polish vessels, and definitions; fishing authorizations covering issuance of permission to fish; registration and designation of fishing vessels and gear; observance of fishing orders covering safety measures; fisheries protection covering conservation practices; fisheries supervision including enforcement; penal provisions comprising fines and other sentences for violations; and final provisions including repeal of prior laws.

"Statki rybackie dla malych portow Polskiego wybrzeza. Czese III" (Fishing vessels for Poland's small fishing harbors. Part III), by Bohdan Pradzynski, article, Bodownictwo Okretowe, vol. 9, no. 11, Nov. 1964, pp. 382-384, illus., printed in Polish with English summary. Wydawnictwa Czasopism, Technicznych NOT, Czackiego 3/5, Warsaw, Poland. Parts I and II discussed the traditional types of fishing vessels. This part deals with tuna boats and catcher-trawlers. The author visualizes a tuna boat with Poland's small harbors as base ports. The tuna boat discussed is in part patterned after the modern French tuna vessel.

POLLUTION:
Contaminacion de las Aguas y Otras Alteraciones Ambientales que Afectan Nocivamente a los Organismos Acuaticos (Contamination of the Waters and Other Environmental Changes which Adversely Affect Aquatic Organisms), by Felipe Brizuela A., Serie: Trabajos de Divulgacion, vol. VII, no. 62, 22 pp., processed in Spanish, Aug. 1963. Departamento de Estudios Biologicos Pesqueros, Direccion General de Pesca e Industrias Conexas, Secretaria de Industria y Comercio, Mexico, D. F.

PORTUGAL:
"Portugal: evolucion de las pescas en 1963. I"; "II" (Portugal: development of the fisheries in 1963. I; II), articles, Industrias Pesqueras, vol. 38, no. 894, July 15, 1964, pp. 328-329; no. 895, Aug. 1, 1964, pp. 348-350, illus., printed in Spanish, single copy 50 ptas. (about 85 U. S. cents). Industrias Pesqueras, Policarpo Sanz, 21 - 2°, Vigo, Spain.

POULTRY NUTRITION:
The following articles are from News Summary, no. 15, Sept. 1964, processed in English with French, German, and Spanish summaries, limited distribution. International Association of Fish Meal Manufacturers, 70 Wigmore St., London W1, England.:

"The protein requirements of laying hens," by J. R. Couch, pp. 77-81.

"Response to fish meal in laying hen diets," by J. H. Quisenberry, pp. 65-77.

POULTRY RATIONS:
"The influence of solvent-extracted fish meal, stabilized fish oil and texture of corn in broiler rations," by J. O. Hardin and J. L. Milligan, article, Poultry Science, vol. 42, 1963, p. 1275, printed. Poultry Science Association, Kansas State College, Manhattan, Kans.

QUALITY:
"Liquor loss as an index to fish texture," by W. T. Little and R. H. Smithies, article, Chemistry and Industry, no. 29, July 18, 1964, pp. 1293-1295, printed. Society of the Chemical Industry, 14 Belgrave Sq., London SW1, England.

REFRIGERATION:
"Refrigeration for small fishing vessels," by A. C. Blain, article, Fisheries Newsletter, vol. 23, no. 10, Oct. 1964, pp. 23-25, illus., printed. Fisheries Branch, Department of Primary Industry, Canberra, Australia. This is the first of two articles describing some of the methods of refrigeration suitable for small vessels in the 30-foot to 50-foot range, particularly those where no provision has been made for refrigeration equipment. Installation of refrigeration equipment in existing vessels creates two problems: (1) space for equipment; and (2) allowance for displacement. The basic requirement for any refrigerated hold is good insulation. It has been found that if the hold is piped on the basis of 1½ cubic feet of hold space for each lineal foot of 1-inch diameter refrigeration pipe (or

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in the same ratio with other size pipes) and the compressor and condensor balanced against the piping, a satisfactory system results. Brine-freezing of crustaceans has been found to be the more rapid and economical method for smaller vessels, as salt penetration is not as marked as it is for trawl fish immersed in brine solution. It is preferable to operate the equipment prior to loading to ensure a cold reserve when the product first enters the freezer. Agitated or circulated brine will increase efficiency considerably.

SAFETY:
"Avoiding accidents on deck," article, World Fishing, vol. 13, July 1964, pp. 72, 75, printed. John Trundell & Partners Ltd., St. Richard's House, Eversholt St., London NW1, England.

SALMON:
Effect of the March 27, 1964 Earthquake on Pink Salmon Alevin Survival in Prince William Sound Spawning Streams, by Wallace H. Noerenberg, Informational Leaflet No. 43, 10 pp., processed, 1964. Department of Fish and Game, Subport Bldg., Juneau, Alaska.

The Fourth Annual Johnson Strait Report on the Status of the Even Year Pink Salmon Stocks and of the Chum Salmon Stocks of the Johnson Strait Study Area and on the Prospects for 1964, 43 pp., printed, 1964. Department of Fisheries, Pacific Area, Vancouver, B. C., Canada.

"Lipids of salmonoid fish. III--Acetone-soluble lipid from muscle of Oncorhynchus keta," by Mutsuo Hatano and others, article, Chemical Abstracts, vol. 58, Mar. 4, 1963, abstract no. 4841e, printed. American Chemical Society, 1155 16th St., NW., Washington, D. C. 20006.

Research Briefs, vol. 10, no. 1, June 1964. 74 pp., illus., printed. Fish Commission Research Laboratory, Route 1, Box 31A, Clackamas, Oreg. 97015. Contains, among others, these articles: "Analysis of average-weight sampling of commercial catches of Columbia River chinook salmon," by Earl F. Pulford; "Fecundity of Columbia River chinook salmon," by James L. Galbreath, and Richard L. Ridenhour; "The effect of confinement on blood lactate levels in chinook and coho salmon," by Robert J. Ellis; "Ranking of wet ingredients for Oregon pellets," by John W. Westgate, Thomas B. McKee, and Duncan K. Law; "Experiments with repeated spawning ground counts of coho salmon in three Oregon streams," by Raymond A. Willis; "A modified method of analyzing stomach contents with notes on the food habits of coho salmon in the coastal waters of Oregon and Southern Washington," by Paul E. Reimers; and "Occurrence of juvenile salmon in stomachs of adult coho salmon," by Richard L. Angstrom and Paul E. Reimers.

The following articles are from Izvestia Tikhookeanskogo Nauchno-Issledovatel'skogo Instituta Rybnogo Khoziaistva i Okeanografii, vol. 48, 1962. Four Continent Book Corp., 156 Fifth Ave., New York, N. Y. 10010.:

"O primenenii vital'nogo okrashivaniya mal'kov tikhookeanskikh lososei dlya ikh kolichestvennogo ucheta" (Use of a vital stain for marking Pacific Ocean salmon young for their quantitative censusing), by V. Ya. Levanidov, pp. 206-207, printed in Russian.

"Zapasy amurskikh kososei in gidrostroitel'stvo" (Stocks of Amur salmon and hydroelectric construction), by V. Ya. Levanidov, pp. 133-140, printed in Russian.

The following articles, printed in Russian, are from Referativnii Zhurnal-Biologiia, 1963. Akademiia Nauk SSSR, Institut Nauchnoi-Informatsii, Moscow, U.S.S.R.:

"Khod gorbushi v reku Volongu" (Run of pink salmon in the Volonga River), by L. A. Danilenko, No. 8154.

"Metodika i ruzul'taty mecheniya val'chakov semgi v r. Varzuge v 1958-1959 gg." (Procedure and results of tagging salmon kelts in the Varzuga River in 1958-1959), by M. N. Mel'nikova, No. 819.

"Vyrashchivanie molodi lososya na iskusstvennom korme KRT-III" (Rearing young salmon on the artificial food KRT-III), by E. M. Malikova, No. 12176.

"Vyrashchivanie zhivykh kormov v prudakh dlya molodi lososya pri nizkikh temperaturakh" (Raising live food in ponds for young of salmon at low temperatures), by M. M. Isakova-Keo, No. 35245.

SALMON AND STEELHEAD:
Oregon Coastal Salmon and Steelhead Tagging Programs, Part I--Tillamook Bay, 1953, by Kenneth A. Henry; Part II--Siletz River, 1954, by Alfred R. Morgan, Contribution No. 28, 62 pp., illus., printed, May 1964. Oregon Fish Commission Research Laboratory, Route 1, Box 31A, Clackamas, Oreg. 97015.

SALTED FISH:
Review of Salted Fish Production and the European Markets, 1963-64 Season, 58 pp., printed, 1964. Hawes and Company (London) Ltd., London, England.

SCALLOPS:
The Scallop Fishery of Massachusetts (Including an Account of the Natural History of the Common Scallop), by David L. Belding, Marine Fisheries Series--No. 3, Contribution No. 13, 57 pp., illus., reprinted, 1964, 40 cents. Division of Marine Fisheries, Department of Natural Resources, 15 Ashburton Pl., Boston 8, Mass. The scallop differs from the clam, oyster, and quahaug in that it has more rapid growth, a shorter life, is less likely to transmit disease if taken from contaminated waters, and is less adapted to cultivation. Part I, covering natural history of the scallop, discusses its anatomy, early life history, habits, and growth. Part II, encompassing the scallop fishery, presents information on the fishing grounds, the industry, laws concerning scallops, and methods of improving the scallop industry.

SCOTLAND:
Scottish Fisheries Bulletin, no. 21, June 1964, 28 pp., illus., printed. Department of Fisheries for Scotland, Edinburgh, Scotland. Includes, among others, articles on: "Forecast for Scottish North Sea and West Coast herring fisheries in 1964," by B. B. Parrish and A. Saville; "Artificial hatching and rearing of lobsters--a review," by H. J. Thomas; "Herring trawling off the West Coast of Scotland," by I. G. Baxter; "The

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sprat fishery," by Alan Saville; and "Scallops in Scotland," by Bennet B. Rae.

SEALS:

"The use of electric current in catching seals," by B. I. Badamshin, V. N. Lukashev, and A. Kh. Pateyev, article, General Studies on the Fishing Industry, USSR, JPRS 25, 581, pp. 17-24, processed, July 24, 1964, $3. (Translated from the Russian, Rybnoe Khozyaistvo, no. 4, April 1964, pp. 51-55.) Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.

SEAWEED:

Proceedings of the 4th International Seaweed Symposium, Biarritz, September 1961, edited by Ad. Davy de Virville and J. Feldmann, 490 pp., printed, 1964, £5 (about US$14). Pergamon Press, 122 E. 55th St., New York, N. Y. 10022.

SHAD:

"Mesta i usloviya neresta sel'dei roda Alosa v Severnom Kaspii v 1934-1937 gg." (Localities and conditions of spawning of shad of the genus Alosa in the North Caspian Sea in 1934-37), by T. A. Pertseva-Ostroumova, article, Trudy Instituta Okeanologiia, Akademiia Nauk SSSR, vol. 62, 1963, pp. 28-48, printed in Russian with English summary. Trudy Instituta Okeanologiia, Akademiia Nauk SSSR, Moscow, U.S.S.R.

SHARKS:

Aspectos Interesantes para la Pesca de Tiburon en Mexico (Interesting Aspects of the Shark Fishery in Mexico), by Victoria Marin A., Serie: Trabajos de Divulgacion, vol. IX, no. 88, 26 pp., illus., processed in Spanish, July 1964. Departamento de Estudios Biologico Pesqueros, Direccion General de Pesca e Industria Conexas, Secretaria de Industria y Comercio, Mexico, D. F.

Feeding Behavior in Three Species of Sharks, by Edmund S. Hobson, Contribution No. 180, 24 pp., illus., printed. (Reprinted from Pacific Science, vol. 17, no. 2, Apr. 1963, pp. 171-194.) Hawaii Marine Laboratory, University of Hawaii, Honolulu, Hawaii.

A Revision of the Carcharhinid Shark Genera SCOLIODON, LOXODON, and RHIZOPRIONODON, by Victor G. Springer, Proceedings of the United States National Museum, Smithsonian Institution, Washington, D. C., vol. 115, no. 3493, 1964, pp. 559-632, printed. U. S. National Museum, Washington, D. C. 20560.

Sharks and Survival. Chapter 8--Olfaction, Gustation, and the Common Chemical Sense in Sharks, by Albert L. Tester, Contribution No. 188, 28 pp., illus., printed. (Reprinted from Sharks and Survival; pp. 255-282. Hawaii Marine Laboratory, University of Hawaii, Honolulu, Hawaii.

SHELLFISH CULTURE:

"Artificial cultivation of clams, oysters proved practical in N. C. (North Carolina) laboratory," by Bob Simpson, article, National Fisherman/Maine Coast Fisherman, vol. 45, Aug. 1964, p. 13, printed. Journal Publishing Co., Belfast, Maine.

SHRIMP:

"Gefriertrocknung soll Deutschen krabbenfishern helfen" (Freeze-drying must help German shrimp fishermen), article, Ties Kuhlkette, vol. 8, no. 95, Nov. 1963, p. 28, printed in German. H. E. Albrech Verslag KG., Freihamerstrasse No. 2, Munich T. Germany.

General Information about Canned Shrimp, 4 pp., illus., processed, Aug. 1964. Robinson Canning Co., Inc., P. O. Box 4248, New Orleans, La. 70118. Discusses briefly types of canned shrimp--wet or dry pack; style--regular or deveined pack; sizes--broken, tiny, small, medium, large, jumbo, and colossal; inspection in plants during and following World War II; can sizes--4½-oz. and 5 oz.; equivalent can contents in terms of fresh raw shrimp; private label buyers; packaging and shipping, and shipping data; and routing of shipments.

"A note on the prawn fishery of Kutch," by S. Ramamurthy, article, Journal of the Marine Biological Association of India, vol. 5, no. 1, 1963, pp. 146-148, printed. Marine Biological Association of India, Marine Fisheries, P. O., Ramanathapuran Dist., South India.

Radiation Pasteurization of Shrimp. Final Summary Report for the Period January-December 1962, by Arthur F. Novak and J. A. Liuzzo, ORO-601, 1 vol., illus., printed. Division of Technical Information, U. S. Atomic Energy Commission, Washington, D. C. 20545.

"Rapid method for determination of moisture in freeze-dehydrated shrimp," by J. E. Despaul and D. W. Ezerski, article, Journal of the Association of Official Agricultural Chemists, vol. 46, no. 6, 1963, pp. 1001-1003, printed. Association of Official Agricultural Chemists, P. O. Box 540, Benjamin Franklin Station, Washington, D. C. 20004.

"What future trading means to the U. S. shrimp industry," article, Fish Boat, vol. 9, Aug. 1964, pp. 23-24, 37-40, printed. H. L. Peace Publications, 624 Gravier St., New Orleans 9, La.

SMALL BUSINESS MANAGEMENT:

The following reports are published by Small Business Administration, Washington, D. C. 20416.:

Cost Reduction in Small Manufacturing Plants, by E. C. Keachie, Management Research Summary, 4 pp., illus., processed, 1964. Unit manufacturing costs decrease in a special way not revealed by traditional techniques for estimating costs--rapidly at first, and then at a diminishing but predictable rate. Improvement takes place according to a simple relation that can be charted as the "learning curve"; the same percent of increase in productivity takes place every time the total production doubles. The learning curve can be a prime tool of small manufacturers in cost reduction and control. Those who used it in connection with this study reported improvement in productivity, methods and product design, lot sizing, worker aptitudes, checking bids, and promptness in meeting delivery dates.

Operations Research for Small Business, by John E. Hosford, Technical Aid for Small Manufacturers No. 89, 4 pp., processed, Nov. 1964. Operations research (OR) is a technique which uses various fields of knowledge--such as mathematics, chemistry, and other

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sciences--to solve industrial problems. For example, OR uses mathematics to examine various possible solutions to problems such as inventory, warehousing, transportation, resource allocating, and scheduling. In examining alternatives, OR does two things: (1) defines and clarifies the operational problem, and (2) predicts what will happen if any particular part of the operation is changed. This leaflet explains how operations research is used and describes several of its basic tools, such as queueing, linear programing, dynamic programing, and simulation.

Tax Guide for Small Business, 1965, Publication No. 334, 160 pp., illus., printed, 1964, 50 cents. Internal Revenue Service, U. S. Treasury Department, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) A guide for use in filing the 1964 income tax returns, excise tax returns, and other returns for 1965. Answers the Federal tax questions of corporations, partnerships, and sole proprietorships. Explains in plain layman's language the tax results from buying, starting, operating, and the sale and other disposition of a business. In addition, contains a tax calendar for 1965 which should prove helpful to the businessman throughout the year, since it indicates what he should do and when he should do it in regard to the various Federal taxes. Also has a checklist of special interest for the man just starting in business in that it affords a quick method of determining for what Federal taxes he may be liable. This edition has been brought up to date and includes explanations of the provisions of the new tax law, as they affect businessmen. Some of the changes discussed are new lower rates, income averaging, travel expense rules, interest on certain deferred payments, and disposition of depreciable property.

SMOKING:

"Improving the traditional method of smoking," article, Fisheries Research Report, vol. 1, no. 1, 1962, pp. 8-11, printed. Fisheries Inspectorate Unit, Accra, Ghana.

SOUTH AFRICA REPUBLIC:

The Fishing Industry of South and South West Africa, (supplement to the Standard Bank Review), by Peter Hjul, 15 pp., illus., printed, November 1964. The Standard Bank of South Africa Limited, Cape Town, Republic of South Africa. This attractively color-illustrated booklet discusses the growth of the fishing industry from a catch of 20 million metric tons a year immediately after World War II to 45 million metric tons in 1962; research by the Government's Division of Sea Fisheries; species landed, such as hake, spiny lobster, tuna, maasbanker, mackerel, and pilchard; and the quota system for landings by the various factories. Also covered are production and marketing of canned fish and fish meal; production techniques for fish meal, fish oil, and canned fish; plans for the future by the Fisheries Development Corporation; protection, landings, and exports of spiny lobsters; increase in number of trawlers and production of quick-frozen fillets and fish sticks; and fishing by vessels of Russia, Poland, Japan, and Spain off the coasts of South and South West Africa.

Index to the Publications of the Fishing Industry Research Institute, January 1947-June 1963, compiled by C. R. Houba, 97 pp., processed, 1964. Fishing Industry Research Institute, University of Cape Town, Cape Town, Republic of South Africa.

The South African Fishing Industry Handbook and Buyers' Guide, 1964/65 (Seventh Edition), 320 pp., illus., printed, R4.20 (about US$5.90). Thomson Newspapers, South Africa (Pty.) Ltd., Box 80, Cape Town, Republic of South Africa. This edition of the handbook reviews the progress of the South African and South-West African fishing industry during 1963 and 1964 and gives details of the catch and production of fishery products. Included is information on recent developments in the fishing industry; fish-processing factories; fish and shellfish landings; South African fish species; legal minimum size limits of South African fish; and organizations serving the industry. Also lists the leading personalities in the industry; South and South-West African fishing companies; distributors of fresh and frozen fish; producers of processed fish; suppliers to the fishing industry; regulations for fishing vessels, motor vessels, trawlers, and steam trawlers; types of marine engines; and suppliers of fuels and lubricants. An excellent guide for anyone interested in the South and South-West Africa fisheries.

SOUTH AMERICA:

Anuario de Pesca, 1963/1964 (Fisheries Yearbook, 1963/1964), 130 pp., illus., printed in Spanish, $7. Ediciones Sudamerica S. A., Av. Wilson 911, Oficina 301, Apartado 877, Lima, Peru. Includes articles on: "Urge mejorar puertos" (It is urgent to improve ports); "Conservas: crisis que perdura" (Canning industry: a crisis that continues); "Hay que pescar para todos" (There is fishing for all); "Harina de pescado: perspectivas ilimitadas" (Fish flour: unlimited prospects); "Tributación en Chile y Peru" (Taxation in Chile and Peru), by M. Bapalu; "Sigue subiendo produccion de harina y aceite de pescado" (There follows a rising production of fish meal and oil); "Productores Pesqueros del Peru" (Peruvian fishing firms); and "Proveedores de la pesqueria" (Suppliers for the fishing industry).

SPAIN:

Estadistica de Pesca, 1963 (Fishery Statistics, 1963), 646 pp., illus., printed in Spanish, Aug. 1964. Direccion General de Pesca Maritima, Ministerio de Comercio, Madrid, Spain.

SPINY LOBSTERS:

Ensayo de Nasas para Langosta en la Bahia de la Ascencion, Quintana Roo, Mexico (Experiment with Traps for Spiny Lobsters in La Ascencion Bay, Quintana Roo, Mexico), by Manuel J. Solis Ramirez, Serie: Trabajos de Divulgacion, vol. VII, no. 66, 19 pp., illus., processed in Spanish, July 1963. Departamento de Estudios Biologicos Pesqueros, Direccion General de Pesca e Industrias Conexas, Secretaria de Industria y Comercio, Mexico, D. F.

SPONGES:

A Revision of the Classification of the Calcareous Sponges (with a Catalogue of the Specimens in the British Museum), by Maurice Burton, 698 pp., printed, 1963, 300s. (about US$42.00). British Museum (Natural History), London WC1, England.

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STARFISH:
"Spawning of starfish: action of gamete-shedding substance obtained from radial nerves," by Haruo Kanatani, article, Science, vol. 146, no. 3648, Nov. 27, 1964, pp. 1177-1179, illus., printed, single copy 35 cents. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D. C. 20005.

STERN TRAWLERS:
"Badania modelowe nad okersleniem wlasnosci napedowych i manewrowych trawlerow rufowych ze sterem normalnym oraz z obrotowa dysza Korta" (Model testing for the determination of propulsion and maneuver properties of stern trawlers with a normal rudder and rotary Kort nozzle), by G. Hahnel, article, Bodownictwo Okretowe, vol. 9, no. 11, Nov. 1964, pp. 385-390, illus., printed in Polish. Wydawnictwa Czasopism, Technicznych NOT, Czackiego 3/5, Warsaw, Poland.

STRIPED BASS:
The Striped Bass in Massachusetts, by George C. Matthiessen, 21 pp., illus., printed. Department of Natural Resources, Division of Marine Fisheries, 15 Ashburton Pl., Boston 8, Mass.

STURGEON:
"Sostav stada i razmnozhenie osetra na Volge nizhe Volzhskoi GES imeni Lenina" (Composition of the stock and reproduction of Russian sturgeon on the Volga below the Lenin Hydroelectric Station), by A. T. Dyuzhikov, article, Referativnii Zhurnal-Biologiia, 1963, No. 8144, printed in Russian. Akademiia Nauk SSSR, Nauchnoi-Informatsii, Moscow, U.S.S.R.

SUBMARINES FOR RESEARCH:
"Biologicheskie issledovaniya, provedennye na podvodnoi lodke 'Severyanka'" (Biological studies conducted on the submarine Severyanka), by M. I. Ryzhenko, article, Trudy Okeanograficheskoi Komissii, Akademiia Nauk SSSR, vol. 14, 1962, pp. 95-102, printed in Russian. Trudy Okeanograficheskoi Komissii, Akademii Nauk SSSR, Moscow, U.S.S.R.

TAGGING:
"A comparison of spaghetti and Petersen tags used on steelhead trout at Gnat Creek, Oregon," by Thomas E. Kruse, article, Research Briefs, vol. 10, no. 1, June 1964, pp. 57-66, illus., printed. Fish Commission Research Laboratory, Route 1, Box 31A, Clackamas, Oreg. 97015.

TECHNOLOGY:
"Fish technology in Britain," by G. H. O. Burgess, article, Chemistry and Industry, no. 29, July 18, 1964, pp. 1293-1295, printed. Society of the Chemical Industry, 14 Belgrave Sq., London SW1, England.

TILAPIA:
"Metody razvedeniya tilyapii v Demokraticheskoi Respublike V'etnam" (Methods of rearing tilapia in the Democratic Republic of Viet-Nam), by Kong T'Am Chang, article, Referativnii Zhurnal-Biologiia, 1963, Abstract No. 12187, printed in Russian. Akademiia Nauk SSSR, Institut Nauchnoi-Informatsii, Moscow, U.S.S.R.

TOXICITY:
Fish Poisoning in Hawaii, by Philip Helfrich, Contribution No. 186, 18 pp., illus., printed. (Reprinted from the Hawaii Medical Journal, vol. 22, May-June 1963, pp. 361-372.) Hawaii Marine Laboratory, University of Hawaii, Honolulu, Hawaii. Fish poisoning has affected more than 433 persons in over 54 recorded outbreaks in Hawaii since 1900, according to this study. Of the four categories of poisoning reported in Hawaii (ciguatera, hallucinatory mullet poisoning, tetraodon or puffer fish poisoning, and scombroid or histamine poisoning), only poisoning by the puffer fish has caused death--seven of them. Gymnothorax (moray), elasmobranch (shark), and clupeid (herring) poisoning have not been recorded in Hawaii. Ciguatera, caused by a neurotoxic substance, is the most serious hazard of all; it is a recent affliction in Hawaii, difficult to predict or control, and produced by many species of fish that are highly esteemed as food; and the toxin seems to have a cumulative effect.

TROUT AND SALMON:
El Cultivo de la Trucha y del Salmon. La Nutricion (The Culture of Trout and Salmon. Nutrition), by Earl Leitritz, Serie: Trabajos de Divulgacion, vol. VIII, no. 73, 39 pp., illus., processed in Spanish, Oct. 1963. (Translated from the English, Trout and Salmon Culture, Fish Bulletin No. 107, California Department of Fish and Game, 1959.) Departamento de Investigaciones Industriales y Economicas, Laboratorio de Tecnologia Quimica Pesquera, Direccion General de Pesca e Industrias Conexas, Secretaria de Industria y Comercio, Mexico, D. F.

TUNA:
Background of the U. S. Regulatory Act for Yellowfin Tuna, 1962, by Ryuzo Ohyama and Koya Mimura, 60 pp., printed in Japanese. Japan Fisheries Resource Conservation Association, c/o Futaba Bldg., 24, Nishikubo, Sakuragawa-cho, Minato-ku, Tokyo, Japan.

"A pesca do atum no arquipelago de Cabo Verde" (The tuna fishery in the Cape Verde Islands), article, Jornal do Pescador, vol. 26, no. 309, Oct. 1964, p. 37, printed in Portuguese, single copy 5 escudos (about 20 U. S. cents). Junta Central das Casas dos Pescadores, Rua de S. Bento, 644-4° Esq., Lisbon, Portugal.

"Pesca e industrializacion del atun" (The fishery and commercialization of tuna), article, Industrias Pesqueras, vol. 38, no. 897, Sept. 1, 1964, pp. 388-389, printed in Spanish, single copy 50 ptas. (about 85 U.S. cents). Industrias Pesqueras, Policarpo Sanz, 21-2°, Vigo, Spain.

"Quelques aspects techniques du probleme thonier" (Some technical aspects of the tuna problem), by E. Postel, article, La Peche Maritime, vol. 43, no. 1040, Nov. 1964, pp. 786-791, illus., printed in French, single copy 14 F (about US$2.85). Les Editions Maritimes, 190, Blvd. Haussmann, Paris, France.

Statistical Report on Tuna Longline Fisheries by Fishing Grounds for 1963, 33 pp., printed in Japanese, Sept. 1964. Statistical Research Division, Agriculture-Forestry Economic Bureau, Ministry of Agriculture and Forestry, 2-1, Kasumigaseki, Chiyoda-ku, Tokyo, Japan. Describes tuna long-line production trends, catch by species, fishing grounds, and by the 6 licensed tuna fisheries (i.e. Japan-based fleet, overseas-based fleet, Atlantic fleet, mothership-type fleets, etc.). Also includes data on prefectural landings, by species

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and by vessels of different size categories. The report shows that in 1963 the Japanese tuna long-line fleet totaled 1,380 vessels (1959--1,437 vessels). They landed a total of 531,500 metric tons of tuna, spearfish, and shark. The catch of yellowfin totaled 125,100 metric tons, declining 19,100 tons, and the catch of albacore totaled 88,900 tons, down 6,900 tons. Bluefin catch increased by 11,200 metric tons, totaling 47,800 tons, and the big-eyed catch increased by 3,000 tons, totaling 128,000 tons. By ocean areas, there were increases in catches for the Pacific Ocean (9,800 tons) and Atlantic Ocean (12,600 tons); Indian Ocean catch declined 24,300 metric tons.

--Lorry M. Nakatsu

Taibei Maguro Kanzume Shosha Kyotei wo Meguru Kobo (Discussion of Exporters' Agreement Covering Canned Tuna Exports to U. S.), 16 pp., printed in Japanese, Oct. 1, 1964. Suisan Tsushin-sha, Chiyoda Bldg., 2-1, Kudan, Chiyoda-ku, Tokyo, Japan. A special issue put out by a Japanese newspaper firm covering problems involving the exporters' agreement on canned tuna for export to the United States. The agreement, renewed annually December 1, was under critical attack in 1964 from segments within the packing industry due to declining canned tuna exports, despite an increase in the United States consumption of canned tuna. The report describes the reasons for the packers' dissatisfaction and the defense made in behalf of the agreement. As of December 4, 1964, settlement over a new agreement covering the period December 1, 1964-November 30, 1965, had not been reached.

--Lorry M. Nakatsu

"Tuna--international fish," by Jean V. Leyendekkers, article, Fisheries Newsletter, vol. 23, no. 11, Nov. 1964, pp. 23-25, illus., printed. Fisheries Branch, Department of Primary Industry, Canberra, Australia. Tuna has been caught and eaten by man since earliest times. Its place in the fishing world of today is no less dominant, since it is one of the major fisheries in Japan, the United States, Chile, France, and a number of other nations. This article, the first in a series of two, discusses the habits and habitats of tuna, occurrence of various species in Australian waters, research by Australian scientists, tagging information and its uses, and distribution and migration paths.

Tuna Long Line Operations in the West Coast of India, by P. K. Eapen, 7 pp., illus., printed. (Reprinted from Indian Sea Foods, vol. 2, no. 1.) Government of India, Offshore Fishing Station, Cochin-5, India. Discusses tuna fishing methods, commencement of tuna long-line fishing in India, exploratory vessel and gear used for long-lining, details of operation, catch rate, and uses and commercial possibilities. Includes statistical tables showing data on 5 exploratory cruises for tuna; and length and weight of fish landed.

TURKEY:

Balik ve Balikcilik (Fish and Fishery), vol. 12, no. 11, Nov. 1964, 32 pp., illus., printed in Turkish with English table of contents. Et ve Balik Kurumu G. M., Balikcilik Mudurlugu, Besiktas, Istanbul, Turkey. Includes, among others, articles on: "Arrangement of otter boards to deep trawl," by Tekin Mengi; and "Observations of Ancona International Fishery Fair and Italy fisheries by technical point of views (Part IV)," by Muzaffer Ozay.

TURTLES:

Clasificacion de las Tortugas de Norteamerica (Capitulo XXXVI) y las Tortugas Marinas (Capitulo XXXVII), (Classification of the Turtles of North America--Chapter XXXVI--and the Marine Turtles--Chapter XXXVII), by Raymond L. Ditmars, Serie: Trabajos de Divulgacion, vol. IX, no. 81, 17 pp., processed in Spanish, Jan. 1964. (Translated from the English, The Reptiles of North America.) Departamento de Estudios Biologicos Pesqueros, Direccion General de Pesca e Industrias Conexas, Secretaria de Industria y Comercio, Mexico, D. F.

UNDERWATER ACOUSTICS:

"Underwater sound: deep-ocean propagation," by Robert A. Frosch, article, Science, vol. 146, no. 3646, Nov. 13, 1964, pp. 889-894, illus., printed, single copy 35 cents. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D. C. 20005. Variations of temperature and pressure have great influence on the propagation of sound in the ocean.

U. S. S. R.:

"Developments of large-scale chemistry and technical progress in the fishing industry," by V. P. Zaytsev, article, Recent Developments in the Fishing Industry, USSR, JPRS 25,670, pp. 1-11, processed, July 31, 1964. $2. (Translated from the Russian, Rybnoe Khozyaistvo, no. 5, 1964, pp. 3-7.) Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.

WASHINGTON:

Washington State Department of Fisheries, 1963 Annual Report, edited by Don Reed, 216 pp., illus., printed. Washington State Department of Fisheries, Rm. 115, General Administration Bldg., Olympia, Wash. Includes information on the activities of the Department of Fisheries during 1963 in research and management--Puget Sound commercial fisheries, troll salmon, coastal investigations, ocean sport fishery, Columbia River fisheries, otter-trawl fisheries, and chum sampling; and power dam research--Cowlitz River project, Lake Merwin program, Priest Rapids spawning channel, Rock Reach spawning channel, Baker River studies, and 1963 fish facilities for power dam projects. Sections are also included on pink salmon research, Indian fisheries, 1963 sport salmon fishery, reimbursable services program, stream improvement, Patrol Division--enforcement, and engineering and construction. Specialized problems are dealt with in chapters on razor clam fisheries in 1963, oyster work, Willapa Bay shellfish management, hatchery runs, salmon marking programs, fish disease investigations, silver salmon studies, fish feeding 1963, egg takes at individual hatcheries, adult escapement to hatchery rocks, fish planted from State salmon hatcheries in 1963, total plants by district and species 1950-63, and fish planted by major watersheds 1963. A considerable portion of the report is devoted to 1963 fisheries statistics on commercial landings and fishway counts.

WATERFRONT BOUNDARIES:

Shore and Sea Boundaries. Volume Two--Interpretation and Use of Coast and Geodetic Survey Data, by Aaron L. Shalowitz, Publication 10-1, 775 pp., illus., printed, 1964, $5.25. Coast and Geodetic Survey, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Print-

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

ing Office, Washington, D. C. 20402.) Deals with the use and interpretation of Coast and Geodetic Survey data, particularly the early surveys and charts, with special emphasis on those features and aspects having legal significance. It interprets for the engineer and the lawyer the topographic and hydrographic surveys and nautical charts of this 157-year-old Government agency in their relation to the establishment of riparian boundaries. It reflects participation by the nation's oldest scientific bureau--through its records and through the expert testimony of its officials--in many important waterfront litigations, some of which involved a boundary demarcation on the ground. Contains 12 chapters which cover the history and organization of the Coast and Geodetic Survey since 1807, when it was established by Thomas Jefferson; technical data pertinent to waterfront boundaries; geographic datums; judicial structure and land ownership in the United States; and the application of Coast Survey data to engineering and legal problems. Numerous citations are furnished to legal and technical authorities. Also contains 7 appendixes, including a comprehensive glossary of terms used in the text; a bibliography of technical and legal sources cited; selected statutes pertaining to the Coast Survey; cases which have had an important impact on the development of the law of tidal boundaries in the United States; and a multicolor reproduction of nautical chart symbols and abbreviations.

WHALE OIL:

"Analysis of fatty acids and fatty alcohols composition of sperm whale oil by gas-liquid chromatography," by M. Mori and others, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 30, 1964, p. 161, printed in Japanese. Japanese Society of Scientific Fisheries, Shiba-Kaigandori 6, Minato-ku, Tokyo, Japan.

WHALES:

"O svyazyakh v raspredelenii zooplanktona morskikh ptits i usatykh kitov" (On interrelations in the distribution of zooplankton, marine birds and baleen whales), by V. M. Gudkov, article, Trudy Instituta Okeanologiia Akademiia Nauk SSSR, vol. 58, 1962, pp. 298-313, printed in Russian. Izdatel'stvo Akademiia Nauk SSSR, Moscow, U.S.S.R.

USES OF PORPOISE-JAW OIL

Porpoise-jaw oil is one of the many materials that keep the wheels of American industry turning. Marine mammals of the cetacean group (including certain whales and most dolphins and porpoises) have small quantities of oil in cavities of the head, especially in the brain "melon" and in the glands of the "hinges" of the jaws. This porpoise-jaw or dolphin-head oil is unique in its chemical composition (different from blubber oil), and its physical characteristics make it an excellent lubricant for watches, micrometers, and other fine instruments.

While the market for these special oils is understandably small (one gallon is said to be sufficient to lubricate at least a million watches), it is nevertheless an important one. Synthetic oils have taken over in some applications, but most of the major industrial companies in the United States use at least small quantities of the dolphin oil for special needs, usually in combination with oils from other sources. The resulting lubricants have a low-pour point--that is, they maintain their liquid state at temperatures as low as 30° below zero F. and they are resistant to oxidation, gumming, and evaporation. Also, because of their unique fatty acid content, porpoise-jaw oils are relatively more "oily" than other oils. The combination of properties leads to their use on delicate mechanisms that must function smoothly after standing idle for prolonged periods.

The business of supplying porpoise-jaw oil was established in the whaling port of New Bedford, Massachusetts, in the middle of the last century, but only the refining process is carried on there today, by one sole remaining refiner. The present raw material source is the blackfish, or pothead whale, one of the largest of the dolphins, which is harvested in Newfoundland. The meat is sold for mink feed, the blubber is rendered for soap, margarine, and other shortening, and the head oil is shipped to New Bedford for refining and formulating. (Industrial Bulletin of Arthur D. Little, Inc., September 1964.)

JAPANESE CULTURED PEARLS

Pearls were originally obtained only in their natural state in pearl oysters living in the sea. The pearl is formed from nacre secreted gradually by the oyster. The pearl is formed when foreign matter accidently gets into the oyster and the oyster, in order to protect itself from the intruder, secretes nacre around it and seals it off.

There are many types of mollusks which emit such nacre, but not all of the pearls formed are valued for use in jewelry. The pearl-like substance found in the common clam and the shortnecked clam is only a white lump and has no value whatsoever. The only pearl shells which produce genuine pearls are the pearl oyster, the white and black-lip oyster, and a few others.

Natural pearls were found in the past in oysters in the bays of Persia, near the island of Ceylon, and off the Australia coast. However, the quantity was limited and only kings and noblemen were able to acquire those rare jewels.

Pearl cultivation was started relatively long ago. It has been recorded that a Swede succeeded in cultivating hemispherical pearls in 1760. According to the method used then, a hole was drilled in the shell of the oyster and a bit of foreign matter was inserted into the flesh of the oyster. Other methods developed were similar to the Swedish method. All utilized the instinctive power of the oyster to cover the foreign matter with nacre.

The first person in Japan to succeed in cultivating pearls was the late Kokichi Mikimoto, who later gained fame as the "Pearl King." His first products were hemispherical pearls which were attached to the shell. Five years later, in July 1893, Mikimoto discovered several semispherical pearls in the type of pearl oyster called Akoyagai. Since then cultured pearls produced in Japan have been exported to overseas markets, and in 1904, on the occasion of the St. Louis World's Fair, Japan exhibited its cultured pearls abroad for the first time.

Mikimoto's success in cultivating pearls provided the basis for a flourishing business and production of a large quantity of cultured pearls began. However, the products were all semiround pearls and were not suitable for adornment. Therefore, it was necessary to round out the flat part of the pearl by joining it with a piece of pearl shell or another semispherical pearl. Studies to rectify this defect were carried out by Mikimoto and other pearl cultivators and finally, about 1908, they succeeded in developing perfectly round pearls.

With successful cultivation of round pearls, the industry has flourished in Japan to this day. Some 24 prefectures, centering around the Nankai district, are now cultivating pearls. The mother oyster used in Japanese pearl farms is the Akoyagai. The ideal place for the cultivation of this mollusk is a quiet sea where the water is not too salty and the temperature of the water is from 15° to 25° C. (59°-77° F.). In other words, the most ideal places are the small inlets and bays of islands in the southern part of Japan.

Pearl cultivation begins with the raising of the Akoyagai oyster. During June and July, rafts are floated on the sea and clusters of the foliage of the Japanese cedar are tied with ropes and hung under the rafts. These two months are the egg-laying period for the Akoyagai, and a large number of eggs become attached to the leaves. The eggs are then collected and placed in woven wire baskets and hung under the raft for another two to three years. When the shell grows to 30 to 40 grams in weight, it can be used as a mother oyster. This operation is handled by the oyster cultivators.

The pearl cultivators now take over and insert pieces of foreign matter into the oysters. Since the foreign matter will become the core of the pearl, care must be taken in the selection of the material to be used. The material generally used for the core are pieces of shell

(Continued on next page.)

from ditch clams. The shell is cut into small pieces of several millimeters in thickness and are inserted into the body of the mother oyster with a pincet. The mother oyster then starts to secrete the lustrous nacre.

When the piece of shell is inserted, part of the membrane of the mantle of the living oyster is cut out and inserted together with the nucleus. This step is supposed to accelerate the rate of secretion of nacre by the oyster. After the nucleus has been implanted in the oyster, the oyster is again placed in a basket and hung under the raft. The oyster secretes nacre which gradually surrounds the nucleus and in a year, small cultured pearls are available. It takes from 2 to 3 years to produce medium pearls and from 5 to 6 years for large pearls.

However, not all of the oysters will survive. Because of the "red current" and other damaging parasites which afflict the oyster, only about 4,000 out of 10,000 oysters will manage to survive and produce pearls. Of the pearls produced by the 4,000 oysters, only about 10 to 15 percent are commercially marketable.

The size of pearls produced in Japan is generally from 1 to 3 millimeters in diameter with a maximum of 10 millimeters. It is considered difficult to cultivate pearls of more than 12 millimeters as the size of the mother oyster is limited.

There are numerous colors ranging from white and silver to pink, cream, black, and blue. Pink and white pearls are popular in Japan and Western countries. Pearls of different colors are produced not only because of the individual differences of the nacre excreted by the oysters but also due to the type of sea water the oyster had been placed in. Studies on producing any color desired have been conducted but objections have been raised, claiming that to do so commercially would devalue the pearl's value as jewelry.

Japan produces about US$56 million worth of cultured pearls a year. Some 90 percent are exported. Last year, exports amounted to $47.2 million--a two-fold increase over the $23.6 million exported in 1959. Some 40 percent of the exports are consigned to the United States, another 20 percent to Switzerland, and the bulk of the remainder to West Germany, Hong Kong, France, Italy, and India.

Prior to export, a Government inspector examines each pearl to prevent any inferior product from being shipped overseas to maintain the prestige of Japanese cultured pearls in the world market. (Japan Information Service, Consulate General of Japan, New York City.)

WOMEN TAKE PART IN FISHERY RESEARCH CRUISES

A new precedent has been set at the U. S. Bureau of Commercial Fisheries Biological Laboratory, Woods Hole, Mass. Women now routinely take part in the Bureau's biological-oceanographic cruises. Mrs. Ruth Stoddard, Fishery Research Technician, and Miss Lisbeth Francis, Antioch trainee, broke the ice on the fall 1964 survey cruise. This particular cruise lasted 15 days and was noteworthy for the consistent bad weather encountered. But the young ladies suffered not one day of seasickness. It was the considered opinion of the scientific and vessel crew that the ladies were as good or even better than their male counterparts in getting the work done.

BIOLOGICAL CONTROL SOUGHT FOR BOAT DESTROYER

A United Nations agency and the Indian Government are joining forces with a marine flatworm to hunt the teredo, a sea worm which devours the keels of fishing vessels.

The teredo, a molluscan borer, is found in all parts of the world, although it is most active in tropical waters. It is a thin marine worm which eats its way through wood, extending its body to as much as six feet in length, and destroying piers, rafts, fishing traps, and wooden boats.

Recently, the Indian Government became alarmed at the damage which was being suffered by its fishing industry because of this undersea menace. A United States woman zoologist has been sent to India as a forestry officer for the Food and Agriculture Organization in order to begin basic research into the life history of these small creatures and to explore methods of controlling their destructive activities.

All timber exposed to sea water is also exposed to the ravages of the teredo. It attaches itself to the outside of the timber and, with the aid of its grinding teeth, bores right through into the interior, eating the sawdust as it goes. A borer can grow up to six feet in length. The end of the body, which is equipped with a muscle to close the hole behind it when necessary, usually sticks out into the water. A series of tiny feelers are used to eject the body wastes and pass in water and minute particles of food.

These borers have been known to man since he first began sailing the seas, and have in fact, gradually encircled the earth as a consort of man. Burrowed deep within the wooden keel of the windjammers, the teredo has been given free passage through all the oceans.

A boat in infested waters can be completely destroyed in as little as three months. The traditional method of clearing infested timber is to bring the boats into fresh water, though experience has shown that the teredo can retire into the woodwork, seal itself in, and remain dormant for long periods of time.

Nowadays timber is impregnated with chemicals, usually creosote. Even so, an adult borer will on occasion go through a creosote-impregnated plank.

The zoologist is investigating a completely new and untried biological method of controlling the borer while she is in India. She has found that certain species of marine flatworms eat the eggs of the teredo. She believes that flatworms distributed in badly-infested areas might attack and wipe out the borer population.

Disappearance of the teredo would not be universally welcomed for the borer is regarded as a food delicacy in some parts of the world. It is eaten as a normal part of the diet by many fishing populations of South East Asia, as well as the Australian aborigines. Malayan fishermen go so far as to harvest the borer. They set out softwood stakes in the sea-bed and wait for them to become infested with these creatures. Then the stakes are pulled up and taken to land and the borers pulled out and eaten.

The zoologist is working with the India Forest Research Institute at Dehra Dun, where she is training research staff in the identification and laboratory breeding of marine wood-boring molluscs, and in the development of control methods against the molluscs. (Food and Agriculture Organization, Rome, Italy, December 16, 1964.)

THREE SPRING-STYLE RECIPES

There may be times when three is a crowd, but it's a "crowd-pleaser" when the trio happens to be made up of three unusual new seafood dishes designed to fit any menu with taste-pleasing style.

Home Economists of the U. S. Department of the Interior's Bureau of Commercial Fisheries have painted a "picture of wealth" for the homemaker with the creation of three colorful dishes that bring together the elegant, the exotic, and the easy for the ultimate in good eating.

The Elegant--Shrimp in Sour Cream brings all the charm of the old South to your table with today's convenience.

The Exotic--Red Snapper with Curry Sauce brings the enchantment of the Middle East to dinner in a colorful, eye-appealing entree that will intrigue, entice, and haul in a netful of compliments from your mealtime guests.

The Easy--Fish Portions with Almond Cheese Sauce has a natural appeal to any homemaker because it's a fast-to-fix treat with an up-to date beat.

SHRIMP IN SOUR CREAM

1 pound cooked, peeled, and cleaned shrimp, fresh or frozen or
4 cans (4½ or 5 ounces each) shrimp
1 can (4 ounces) sliced mushrooms, drained
2 tablespoons chopped green onion
2 tablespoons butter or margarine, melted
1 tablespoon flour
1 can (10 ounces) frozen condensed cream of shrimp soup, thawed
1 cup sour cream
Dash pepper
Toast points or patty shells

Thaw frozen shrimp or drain canned shrimp. Rinse canned shrimp with cold water. Cut large shrimp in half. Cook mushrooms and onion in butter until tender. Blend in flour. Add soup and cook until thickened, stirring constantly. Add sour cream, pepper, and shrimp. Heat, stirring occasionally. Serve on toast points or in patty shells. Serves 6.

RED SNAPPER WITH CURRY SAUCE

Red Snapper

2 pounds red snapper fillets or other fish fillets, fresh or frozen
½ cup flour
1 teaspoon curry powder
1 teaspoon salt
Dash pepper
Curry Sauce

Thaw frozen fillets. Skin fillets and cut into serving-size portions. Combine flour, curry powder, salt, and pepper. Roll fish in flour. Fry in hot fat at moderate heat until brown on one side. Turn carefully and brown the other side. Total cooking time approximately 8 to 10 minutes, depending on thickness of fish. Arrange fish on a warm serving platter. Pour Curry Sauce over fish. Serves 6.

Curry Sauce

½ cup chopped onion
2 tablespoons melted fat or oil
1 teaspoon curry powder
¼ teaspoon salt
1 cup sour cream
1 tablespoon chopped parsley
1 teaspoon dry white wine

Cook onion in fat until tender. Blend in curry powder and salt. Add sour cream and heat, stirring constantly. Add parsley and wine. Makes approximately 1 cup sauce.

FISH PORTIONS WITH ALMOND CHEESE SAUCE

6 frozen raw breaded fish portions (2½ or 3 ounces each)
2 tablespoons melted fat or oil
Paprika
Almond Cheese Sauce

Place frozen fish portions on a well-greased cookie sheet, 15½ x 12 inches. Drizzle fat over fish. Sprinkle with paprika. Bake in an extremely hot oven, 500° F., for 15 to 20 minutes or until brown and fish flakes easily when tested with a fork. Serve with Almond Cheese Sauce. Serves 6.

Almond Cheese Sauce

2 tablespoons chopped celery
2 tablespoons chopped onion
2 tablespoons melted fat or oil
1 can (10¾ or 11 ounces) condensed cheese soup
⅓ cup blanched slivered almonds
2 tablespoons catsup
2 tablespoons chopped parsley
2 teaspoons lemon juice
¼ teaspoon curry powder
Dash liquid hot pepper sauce

Cook celery and onion in fat until tender. Add remaining ingredients and simmer for 10 to 15 minutes, stirring occasionally. Makes approximately 1⅔ cups sauce.

A Tongue in "Chic" Look at the Slightly "So-fish-ticated" Spring Seafood Styles

A SPRING SHOWING OF

Seafood Styles

EXCLUSIVELY

FOR

YOU

--From Food Editor Press Kit, U. S. Bureau of Commercial Fisheries, Washington, D.C.

Shrimp in Sour Cream

Fish Portions with Almond Cheese Sauce

Red Snapper with Curry Sauce

(See page 132 for recipes.)